DIV. OF FISHES
APR 21 1966
MUSEUMS
LIBRARY

COMMERCIAL FISHERIES REVIEW

VOL. 28, NO. 3

DEPOSITED BY THE
UNITED STATES OF AMERICA

MARCH 1966

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.

DEPOSITED BY THE
UNITED STATES OF AMERICA

UNITED STATES
DEPARTMENT OF THE INTERIOR
STEWART L. UDALL, SECRETARY

FISH AND WILDLIFE SERVICE
CLARENCE F. PAUTZKE, COMMISSIONER

BUREAU OF COMMERCIAL FISHERIES
DONALD L. McKERNAN, DIRECTOR

DIVISION OF RESOURCE DEVELOPMENT
RALPH C. BAKER, ASST. DIRECTOR

COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

Publication of material from sources outside the Bureau is not an endorsement. The Bureau is not responsible for the accuracy of facts, views, or opinions contained in material from outside sources.

Although the contents of the publication have not been copyrighted and may be reprinted freely, reference to the source is appreciated.

Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, May 1, 1963.

5/31/68

CONTENTS

COVER: The crew of the commercial surf clam vessel Gail Borden picking clams from a tow just dumped on deck. Many surf clam shells are dredged along with the live clams. The metal container is a measure used for picking the clams before dumping in burlap bags for stacking on deck.

Page
1 . .Ocean Clam Survey Off U. S. Middle Atlantic Coast--1963, by Phillip S. Parker
10 . .Identification of Species in Raw Processed Fishery Products by Means of Cellulose Polyacetate Strip Electrophoresis, by J. Perry Lane, Wilma S. Hill, and Robert J. Learson

Page
TRENDS AND DEVELOPMENTS:
14 . . A Method of Forecasting the Relative Abundance of Northern Shrimp (Pandalus borealis Kr.) in Maine Waters, by R. L. Dow
Fishing Vessel and Gear Developments:
16 . . Equipment Note No. 19--Trawl Cod-End Closing Device, by William W. High
Alaska:
17 . . Foreign Fishing Activity off Alaska, December 1965
17 . . Sitka to have New Harbor
18 . . Kodiak King Crab Fishery
18 . . Vessel Taxation Change Proposed
Alaska Fishery Investigations:
18 . . Food Habits and Behavior of Salmon Fry
18 . . Red Salmon Fresh-Water Survival Rates Low in Karluk

Page
TRENDS AND DEVELOPMENTS (Contd.):
Alaska Fisheries Explorations and Gear Development:
18 . . Shrimp Resources and Gear Efficiency Studies
California:
19 . . Fall 1965 Pelagic Fish Population Survey
21 . . Survey of Shrimp Resources in Coastal Waters Continued
22 . . Abundance and Condition of Dungeness Crab Surveyed Prior to Open Season
22 . . Cans--Shipments for Fishery Products, January-November 1965
Federal Purchases of Fishery Products:
22 . . Department of Defense Purchases of Fresh and Frozen Fishery Products, November 1965

Contents continued page II.

CONTENTS (CONTINUED)

Page

TRENDS AND DEVELOPMENTS (Contd.):
Fur Seals:
23 .. Interior Department Issues New Proposals for Improved Processing Techniques of Alaska Skins
Great Lakes:
23 .. Michigan Proposes Change in Yellow Perch Commercial Fishing Regulations
Gulf Fishery Investigations:
24 .. Shrimp Biology Program
25 .. Experimental Biology Program
Industrial Fishery Products:
U. S. Fish Meal and Solubles:
26 .. Production and Imports, January-November 1965
U. S. Fish Meal, Oil, and Solubles:
26 .. Production, November 1965
New England:
26 .. Forecast of Groundfish and Sea Scallop Abundance in 1966 on New England Fishing Banks
North Atlantic:
27 .. Soviet Fishing Activity off Coast, January 1966
North Atlantic Fisheries Explorations and Gear Development:
28 .. Surf Clam Survey Continued
31 .. Tuna and Swordfish Explorations in Northwest Atlantic Continued
Oregon:
32 .. Willamette River Silver Salmon Count Resumed in 1965
Salmon:
33 .. Fish Food Contract Awarded
South Carolina:
34 .. Fisheries Biological Research Progress, October-December 1965
U. S. Foreign Trade:
35 .. Airborne Imports of Fishery Products, January-September 1965
36 .. Imports of Canned Tuna Under Quota
Virginia:
36 .. Marine Science Summer Training Program for High School Students
Washington:
36 .. Evaluation of Cost and Production of Fish Farms
Weather:
37 .. New Radio Broadcast Network Established for Mariners
Wholesale Prices:
37 .. Edible Fish and Shellfish, January 1966

FOREIGN
International:
Fish Meal:
39 .. World Production, October 1965 with Comparisons
39 .. Production and Exports for Selected Countries, January-November 1965
Food and Agriculture Organization:
39 .. New Fisheries Department Established
Northeast Atlantic Fisheries Policing Conference:
40 .. Second Session to Meet in London
Salmon:
40 .. Baltic Sea Conservation Agreement Between Denmark, Sweden, and West Germany Ratified

Page

FOREIGN (Contd.):
International (Contd.):
International Whaling Commission:
41 . Antarctic Whaling Operations, 1965/66
41 .. Brazil to Withdraw from Commission
Argentina:
41 .. Fishing Industry Trends, 1964 and First Half of 1965
Brazil:
43 .. Shrimp Shipped to United States from New Processing Firm
44 .. Tuna Fishery Developments, 1965
Bulgaria:
45 .. U. S. S. R. to Import Trawlers from Bulgaria
Canada:
45 .. Tuna Cannery Being Built in New Brunswick
45 .. Groundfish Exports to Australia
45 .. Lobster-Splitting Machine Developed
46 .. Lobsters Shipped to Denmark
46 .. Government Increases Emergency Assistance to Fishermen for Catch Failure
46 .. Insurance for Fish Traps and Shore Installations
46 .. Federal Department of Fisheries Sets up New Office to Administer Economic Aid
46 .. New Trade Commission Office Opened in Far East
46 .. Firm Building Large Fish-Processing Plant at Mortier Bay, Newfoundland
Communist China:
47 .. Lobster Fishing in East China Sea
Cuba:
47 .. Soviets Train Cuban Fishermen
Denmark:
47 .. Tuna Industry Trends
48 .. Minimum Prices Set for Live and Iced Pond Trout Exports to Selected European Countries
49 .. Icing Regulations for Fish
50 .. Baltic Sea Lumpsucker Rich Source of Roe for Caviar
50 .. Frozen Product Labeling Requirements
50 .. Date Marking of Frozen Fishery Products
50 .. Fish Processors Seek Imported Supplies
50 .. Fishery Exports and Catch, 1965
50 .. Government Fishery Loans, Fiscal 1965
51 .. Fishing Vessel Loan Funds Nearly Exhausted
51 .. Ex-Vessel Fish Prices, November 1965
East Germany:
51 .. Fishery Trends, Late 1965
Ghana:
51 .. Norway Delivers Last of Seven Stern Trawlers
Greece:
52 .. Fishery Trends, January-August 1965
Greenland:
52 .. Salmon Catch Declines in 1965
52 .. Shrimp Fishery Trends in 1964 and Future Outlook
Iceland:
53 .. Export Stocks of Principal Fishery Products, November 30, 1965
53 .. Exports of Fishery Products, January-October 1965
53 .. Fishery Catch and Trends, 1965
54 .. Fishery Landings by Principal Species, January-August 1965

Contents continued page III.

CONTENTS (CONTINUED)

Page

FOREIGN (Contd.):
Iceland (Contd.):
54 .. Utilization of Fishery Landings, January-August 1965
Japan:
54 .. Canned Tuna Market Survey in West Germany
55 .. Tuna Canned in Brine Export Sales to U. S. Resumed
55 .. Albacore Tuna Ex-Vessel Price Trends, December 1965
55 .. Albacore Tuna Export Quota to U. S. Increased
56 .. Frozen Tuna Export Prices to Italy, December 1965
56 .. Company Increases Atlantic Ocean Tuna Purse-Seining Effort
56 .. Tuna Purse Seiner Reports Good Fishing in South Pacific
56 .. Five Trawlers to Conduct Winter Operations in Gulf of Alaska
57 .. Fishing Plans for 1966 in Bering Sea-Gulf of Alaska
58 .. Alaska Pollock for Fish Meal to be Bought from Soviets
58 .. Government Announces Fish Meal Import Allocation
58 .. Mackerel Fishing Competition from Purse-Seiners Causes Problems for Pole-and-Line Fishermen
59 .. Mackerel Fishery off to Good Start
59 .. Saury Catch Down in 1965
59 .. Whaling Operation in Newfoundland Under Study
59 .. Herring Roe Shortage Pushes Prices to Record High
59 .. Rest Home for Fishermen to be Established at Las Palmas
60 .. Japan-Communist China Private Fisheries Agreement Renewed
60 .. Fisheries Agency Budget for Fiscal Year 1966
Kenya:
60 .. Fisheries Production, 1964
Republic of Korea:
61 .. Tuna Fishing in Atlantic and Indian Oceans Planned from African Bases
Morocco:
61 .. Canners Complain About Export Controls
New Zealand:
62 .. Japan Seeks Fishing Rights Within New Zealand 12-Mile Fishing Limit
62 .. Twelve-Mile Fishing Zone Claim Discussed With Japan
Nigeria:
63 .. Shrimp Fishery Trends, Late 1965
Norway:
63 .. Exports of Fishery Products at Record Level in 1965
63 .. Ex-Vessel Prices for Industrial Fish in 1966
64 .. Canned Fish Export Trends, January 1-October 9, 1965, With Comparisons
64 .. Cost of Typical New Herring Purse Seiner
65 .. Long-Line Baiting Machine Developed
65 .. Floating Plastic Fish Container Tested

Page

FOREIGN (Contd.):
Pakistan:
65 .. Chinese to Include Fishery Products in Trade Fair
Persian Gulf:
65 .. Shrimp Fleet Built in Norway Arrives in Persian Gulf
Peru:
65 .. Liberalizes License Period for Foreign-Flag Fishing Vessels
Philippines:
66 .. Buy South African Canned Fish
Poland:
66 .. Atlantic Tuna Fishery Not Planned
66 .. Construction and Export of Fishing Vessels
Rumania:
67 .. Discontinues Fishing in the Northwest Atlantic
South Africa Republic:
67 .. Much of 1966 Fish Meal Output Sold in Advance for Higher Prices
South-West Africa:
67 .. White Fish Industry Expansion
67 .. Vessel Owners Seek to Restrict Foreign Fishing Vessels
Thailand:
68 .. Japanese Set Up Joint Shrimp Enterprise in Thailand
Tristan da Cunha:
68 .. Tristan da Cunha Spiny Lobster Fishery, Late 1965
Tunisia:
68 .. Yugoslavia to Construct Fishing Ports
U. S. S. R.:
69 .. Pacific Ocean Perch Landings
69 .. Flounder Explorations in Bristol Bay
69 .. Estonian Fishermen to Fish Off Iceland
69 .. Poland to Build Soviet Oceanographic Research Vessels
69 .. Fishery Aid to India
70 .. Herring Sales to Scotland
70 .. Antarctic Whaling Season, 1965/66
70 .. Limit on Sealing Operations
United Kingdom:
70 .. Freezer-Trawler Fishery Trends, November 1965
70 .. Danish Pond Trout Promoted in Great Britain
Yugoslavia:
71 .. Fishing Industry in Crisis
71 .. Increased Tuna Catches Planned
FEDERAL ACTIONS:
Department of the Interior:
Fish and Wildlife Service:
Bureau of Commercial Fisheries
72 .. Applications for Fishing Vessel Loans
72 .. Hearings on Applications for Fishing Vessel Construction Differential Subsidy
Small Business Administration:
73 .. Loan for Hake Reduction Plant in Aberdeen, Washington
Eighty-Ninth Congress:
73 .. Second Session
75 .. First Session
RECENT FISHERY PUBLICATIONS:
76 .. Fish and Wildlife Service Publications
77 .. Miscellaneous Publications

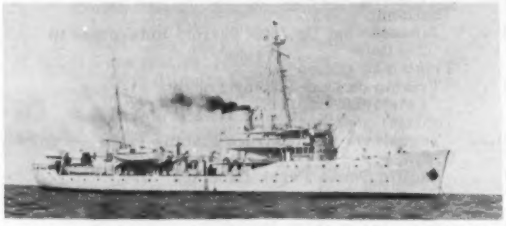
UNDERSEA MOUNTAINS DISCOVERED IN PACIFIC

The discovery of 12 undersea mountains north of the Hawaiian Islands, several of them towering almost 2.5 miles above the ocean floor, was reported May 21, 1965, by the Coast and Geodetic Survey, U. S. Department of Commerce. The massive elevations in the sea floor, termed seamounts by oceanographers, were covered by almost 1 to 2.5 miles of water.

The seamounts are probably of volcanic origin. They were located by C&GS ocean survey vessels in an area dotted with undersea mountains, between 250 and 1,000 miles north of the Hawaiian Islands.

One seamount, discovered by the vessel Surveyor, had a base which covered 18 miles in a North-South direction, with a crater 2 miles across and 900 feet deep. The crater's depth was considered unusual, because undersea mountain craters usually fill up. An oceanographer said this indicated the mountain was "comparatively young," geologically speaking. The seamount was 9,400 feet high, slightly less than the 9,700-foot mountain reported nearby earlier by the Surveyor.

The remaining seamounts were discovered by the vessel Pioneer. One rose 13,100 feet above the sea bottom, almost as high as Mt. Kennedy, the Canadian peak named for the late President. The seamount was discovered in an area where the ocean is more than 3.5 miles deep. The peak was covered by almost a mile of water.



The Pathfinder, one of the larger ocean survey vessels.

Another seamount reported by the Pioneer was almost as tall, 12,720 feet; 4 were about 2 miles high, and the balance ranged from one-half mile to one and a half miles in height.

The seamounts were discovered while the Pioneer and Surveyor were exploring the ocean's depths between the Hawaiian and Aleutian Islands. The Pathfinder, operating in the same general area, also reported discovery of an undersea mountain of undetermined height, its peak covered by 750 feet of water.

Announcement of the discoveries was made after the C&GS vessels returned to their West Coast bases and the data concerning the seamounts could be fully analyzed.

Seamounts have a practical significance for submarine and surface ships. They provide vessels, many of which are equipped with echo-sounders, with important undersea landmarks.

Many seamounts are given names by the Board on Geographic Names and their location noted on nautical charts. An undersea elevation is generally regarded as a seamount if it is at least 3,000 feet high and less than 60 miles across the top. Aside from seamounts, the ocean floor is also filled with giant mountain ranges and plateaus. (Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C., May 21, 1965.)

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.
Price 60 cents (single copy). Subscription Price: $6.50 a year; $2 additional for foreign mailing.

COMMERCIAL FISHERIES REVIEW

March 1966 Washington, D.C. Vol. 28, No. 3

OCEAN CLAM SURVEY OFF U. S. MIDDLE ATLANTIC COAST--1963

By Phillip S. Parker*

ABSTRACT

A cooperative clam survey was conducted during the summer of 1963 by the Eastern Sea Clam Packers Committee of the Oyster Institute of North America and the U. S. Bureau of Commercial Fisheries. The purpose was to locate and assess clam resources in the areas adjacent to those commercially fished. The surveyed areas are off the coast of New Jersey and Delaware on the seaward side of present fishing grounds. Additional concentrations of surf clams (Spisula solidissima) sufficient to sustain the commercial fishery at its present rate of production were not found. Many good catches of black quahogs (Arctica islandia) were made. The scope of the project has now been expanded, and the Bureau is continuing the survey of potential clam-producing areas in the Mid-Atlantic Bight.

INTRODUCTION

The Atlantic surf clam is one of the largest bivalve mollusks known. It is the largest bivalve living on the Atlantic coast and reaches a maximum size of over 7 inches (Miner 1950). Differences in maximum size, however, occur between geographic regions throughout its range.

This clam is of ancient origin: the species has existed for over 10 million years along the east coast of North America (Chamberlin 1961). Its range is from Labrador to the Gulf of Mexico. To date, the surf clam has been found to occur, generally, from the beach to depths of about 150 feet with occasional specimens taken from deeper waters. Distribution is not homogeneous throughout the range; many areas are very sparsely populated while others have beds of heavy concentration. These beds, commonly called "streaks" or "patches," are of most interest to the industry.

In the various areas of the Atlantic coast where it commonly occurs, the surf clam is known locally by different names: "skimmer clam," "beach clam," "giant clam," "sea clam," "hen clam," "bar clam," and "surf clam." U. S. Bureau of Commercial Fisheries biologists have generally adopted the common name "surf clam" and the scientific name Spisula solidissima.

INDUSTRY DEVELOPMENT: From the late 1800's to 1943, the surf clam industry was located along the coasts of New Jersey and Long Island, N. Y. This industry did not become very important until 1943 when, under the stimulus of increased war-time demand, commercial research and subsequent large-scale production were started (Westman 1946). By 1946 catches from surf clam beds adjacent to Long Island's south shore totaled over a half-million bushels a year, yielding about 6.5 million pounds of meats (Ruggiero 1961).

The first signs that many exploited beds off Long Island were being depleted appeared in 1946: boats had to tow faster and work longer hours to maintain their daily catch; a sharp dropoff in the total catch for the area occurred in 1947 and 1948. The 1949 catch improved but since then the catch off Long Island has decreased to a level of less than 50,000 bushels a year.

* Fishery Biologist (General), Exploratory Fishing and Gear Research Base, U. S. Bureau of Commercial Fisheries, Gloucester, Mass.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 756

From 1947 through 1949 unused beds were found near Five-Fathom Banks off the coast of New Jersey and since then New Jersey has been the leading producer of surf clams. A tremendous increase in production has become possible because of (1) the discovery of the new beds, (2) the development of better processing methods, and (3) greatly improved harvesting methods.

GEAR DEVELOPMENTS: One of the factors limiting production during the early history of the clam industry was the harvesting gear used. The earliest methods were hand raking, tonging, or simply hand picking of the clams along the shore above the low-water mark where they were often stranded after storms. All of those methods are inefficient as they require a great amount of time and effort for the volume of clams produced.

To harvest clams in the areas lying beyond the low-water marks, other methods had to be devised. Small box-shaped steel-slatted dredges were the first power-hauled equipment used by fishermen. Those dredges were towed behind small boats and brought in over the stern by means of booms and winches. As the demand for clams increased, successively larger size dredges were built which required larger and more powerful boats. The early dredges had many drawbacks (many of the clams taken by them were either broken or had damaged meats) and attempts were made to improve them.

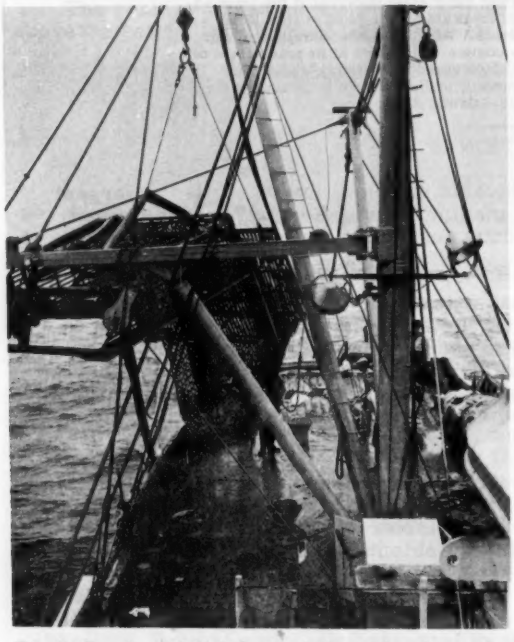


Fig. 1 - Experimental 84-inch wide dredge used on the vessel Gail Borden.

Late in 1945, industry experiments were begun to improve dredges by using hydraulic means for digging. This modification was rather simple: water, pumped under pressure, was used to wash out the clams in front of the dredge blade. After some experimentation, this technique was perfected and it is the principal method used today. The use of water jets made towing the dredge much easier and

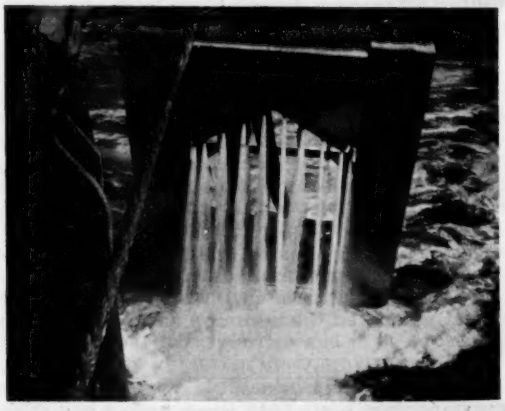


Fig. 2 - Hydraulic jet-dredge of the type used in the commercial fishery. A similar dredge was used for the survey.

greatly reduced injury to the clams. The present trend, as previously with the earlier non-hydraulic dredge, is toward building larger and more efficient dredges. The larger units have blades up to 84-inches wide (fig. 1) with jets supplied by pumps that deliver 3,500 gallons of water per minute at pressures exceeding 130 pounds per square inch. The standard "40-inch" (dimensions refer to the width of the dredge's blade) hydraulic dredge, however, is the one most commonly in use today (fig. 2). The 40-inch dredge also requires a considerable amount of water for efficient operation. To supply this a 1,500 g.p.m. centrifugal pump driven by diesel power is located below the fishing vessel's deck (early powered pumps were usually gasoline-driven units mounted on the deck of the fishing vessel) and connected to the clam

dredge by lengths of special 5-inch i.d. clam-jetting hose, the length of which depends upon the fishing depth. Doubled 5- or 6-inch hoses are used on some of the larger vessels to carry water to the dredges.

VESSELS: The present clam fleet is made up primarily of vessels from other fisheries that have been re-rigged for jet dredging. Included are conversions of Florida shrimp boats, oyster boats, trawlers, and naval-type craft. They range in size from 60 to 150 feet and most of them are powered with diesel engines. The size of the fleet varies because some vessels shift seasonally from clam dredging to other types of fishing. About 52 of them remain year-round in the clam fishery. Those boats can, in good production areas, each catch 500 to 600 bushels of clams a day, but during the past several years they have operated on industry-imposed quotas of 200 and 300 bushels a day. Today, because of depletion of the best producing areas, daily catches have decreased and most of the boats are bringing in all they can produce. The boats are generally operated by a crew of 3 or more men and are owned or controlled by individual packing companies. At the present time there are about 9 major packers or processors of surf clams on the east coast.

FISHING AREAS: The major fishing area now in use is off Point Pleasant, N. J. There appears to be enough large clams left in this area to keep the industry in operation for a few more years, but in order to maintain present production levels new equally productive beds must be located. The new beds must be productive enough to sustain a profitable fishery while younger clams on the old beds or from new "sets" grow to a commercial size.

The position and depth of any new beds located will have a bearing upon the ability of the clammers to continue with present modes of operation. If new beds are too far offshore and too deep many of the existing vessels will be unable to fish there; most of them, principally because of gear and equipment limitations, are able to dredge only in water less than 100-feet deep. It is possible now to hold harvested clams alive for the several hours required to land the catch from nearby fishing areas but an increase in the distance between the port and fishing area would necessitate either faster vessels or a method for keeping the clams alive for longer periods. A possible alternative might be to "shuck" the clams at sea as is done with scallops.

INITIATION OF CLAM SURVEY: The U. S. Bureau of Commercial Fisheries has made several clam explorations. In 1958, as a result of an industry request at the 1957 Atlantic States Marine Fisheries Commission meeting, a short-term exploration for hard clams (Mercenaria mercenaria) and surf clams was made in Nantucket Sound (Ropes and Martin 1960). No additional survey work was attempted until 1963. In June 1963, a cooperative research project was agreed upon by the Bureau and the Eastern Sea Clam Packers Committee of the Oyster Institute of North America. The "committee" provided (1) a suitable vessel, (2) fishing equipment, and (3) a crew for exploratory work. The Bureau supplied technical personnel for the survey. A second agreement and a Congressional appropriation in fiscal year 1965 (July 1, 1964 to June 30, 1965) enabled the Bureau to continue that work.

Work accomplished under the first cooperative agreement is the subject of this report.

Three areas were originally picked for the survey and assigned priorities corresponding to the area number. As the survey progressed, a fourth area was picked and assigned top priority (fig. 3). The survey areas are described as follows:

Area I: A rectangular plot (about 40 by 12 miles) with the western boundary approximating the 100-foot depth contour and extending eastward 12 miles. The area is bounded on the north by the 40th parallel and on the south by lat. 39°20' N. (Mannasquan to Atlantic City, N.J.).

Area II: An area extending southwestward from Area I of about the same size and shape. The north boundary is adjacent to Area I; the south boundary approximates lat. 38°46' N. (opposite Cape May, N. J.).

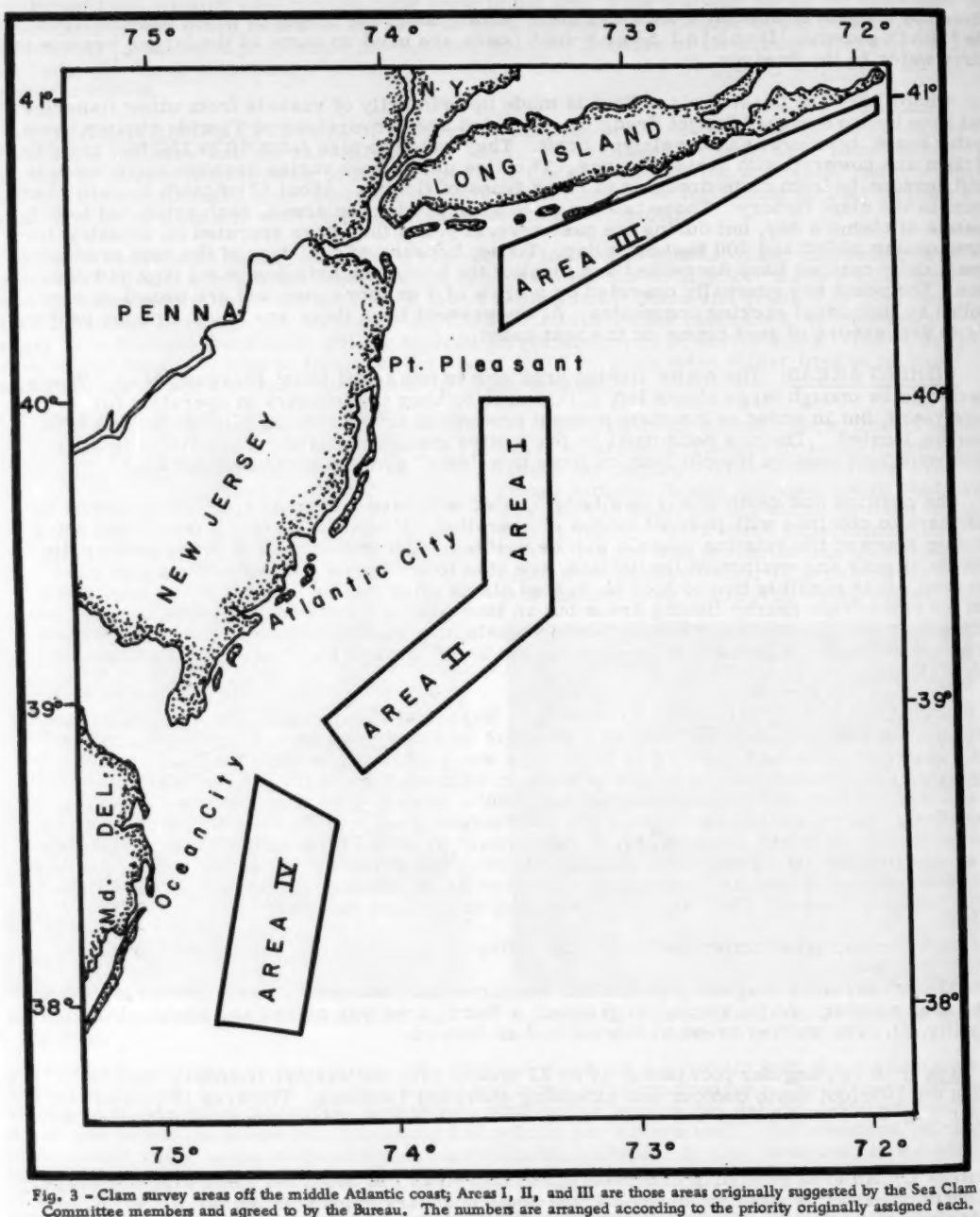


Fig. 3 - Clam survey areas off the middle Atlantic coast; Areas I, II, and III are those areas originally suggested by the Sea Clam Committee members and agreed to by the Bureau. The numbers are arranged according to the priority originally assigned each. The Committee requested that Area IV be surveyed during the last 6 weeks of the survey.

Area III: Waters adjacent to the south shore of Long Island, N. Y., between the 10- and 20-fathom depth contours.

Area IV: The north boundary is lat. 38°47' N., the latitude of Cape Henlopen, Dela.; the south boundary is lat. 37°55' N., near Winter Quarter Light. East and west boundaries were set about 8 miles on each side of a straight line approximating the 120-foot contour.

SURVEY PROCEDURE

VESSEL AND DREDGE EQUIPMENT: In early July 1963, a chartered vessel was readied for the survey. Originally it was planned to use a medium (one-half cubic yard) industrial earth-moving clam-shell type bucket for sampling purposes. It was believed that this unit might be a more efficient piece of gear for sampling than the clam dredge because all material on the bottom encompassed by the bucket would be retained, and an accurate assessment of all material within the area sampled could thus be made. Early trials, however, showed that this unit could not be satisfactorily operated from the vessel and the bucket was replaced by a small 20-inch nonhydraulic dredge of a type originally used by the industry.

The nonhydraulic dredge was likewise discarded early in the survey and replaced with a 30-inch wide hydraulic jet-dredge similar to those in use by the industry (fig. 2). The sides of that dredge were lined with one-half inch hardware cloth and the distance between the knife grids was reduced by adding extra slats to the blade to retain the smaller sizes of clams. Also, the chain bag was replaced by a small nylon-mesh cod-end bag, but despite those changes some of the smaller clams were lost. Compared to the "dry" dredge, the jet-dredge reduced breakage of the clams, increased the numbers caught, and improved the size range of the clams taken.

Clam-Sounder: A "clam-sounder" was used experimentally throughout the survey. This was similar to a prototype that had been built and used by an industry vessel during limited earlier survey work. During the first period of the 1963 survey, an enlarged model of the unit was used (fig. 4). This sounder was towed separately from the dredge.

The main component of the sounder is a hollow waterproof tube inside of which small microphones are attached to a wooden panel. The tube body is attached to a sled-like carriage so that the unit will slide along the surface of the bottom. Welded in a row along one side of the tube (fig. 4) are many steel fingers. When one or more of the fingers strikes any object the sound produced is picked up by the microphones, amplified, and reproduced in the pilothouse. The sound of the fingers striking upon surf clams can readily be distinguished, by an experienced operator, from extraneous sounds so that a general indication of the relative abundance of clams in the path of the sounder can be obtained.

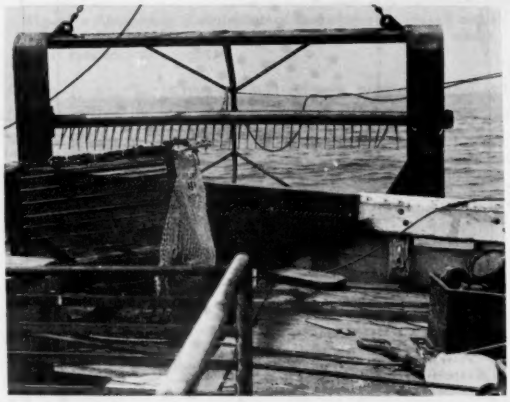


Fig. 4 - Clam sounder (at rail of vessel) used during survey operations. Note "teeth" mounted on pipe. Telephone microphones which transmit the sounds of clams being struck by the teeth are secured inside the pipe.

A log of the sounds transmitted by the sounder, while being towed between stations, was kept and those data were correlated with the sample collected at each sampling station.

During the last period of the survey, a shorter clam-sounder was attached directly to the dredge just in front of the jet manifold so that the dredge acted as a sled for the sounder.

The clam-sounder was of less use during the 1963 operations than was anticipated because of frequent flooding of the sounding tube and the enclosed microphones. The effective-

ness of the principle of sounding for clams in this manner, however, was established; Bureau electronic specialists designed a more dependable model with specially designed submersible hydrophones for underwater sound detection for use during succeeding survey work.

SAMPLING STATIONS: It was not possible in a limited time to completely investigate any of the four survey areas. The survey began in the southern section of Area I and was shifted to Area IV for the last 6 weeks. Sampling stations were established 1 mile apart on a grid pattern within each area arranged to coincide with LORAN lines. Unsurveyed portions of any area can thus be located and completed at a later date without difficulty.

A sample was taken at each station by a 5-minute tow of the jet dredge. Elapsed time of the tow included only the period when the water was flowing at maximum volume through the jets of the dredge.

The surf clams and black quahogs in each sample were measured and weighed, and additional pertinent data, such as bottom type and other organisms present, were recorded for the remaining material in the catch.

SURVEY RESULTS

AREA I: Surf Clams: In Area I, 148 of the 181 stations surveyed yielded small quantities of surf clams, usually mixed with black quahogs (fig. 5). As the survey progressed northward from the southern boundary of the Area, the number of stations producing surf clams increased but at no time were they found in sufficient concentrations to be of commercial interest in the surveyed portion of Area I. To support commercial fishing operations a minimum catch rate of about $\frac{1}{4}$ bushel per minute of towing time is required. (Catches of one-half bushel or more of surf clams per 5-minute tow are listed in the appendix.)

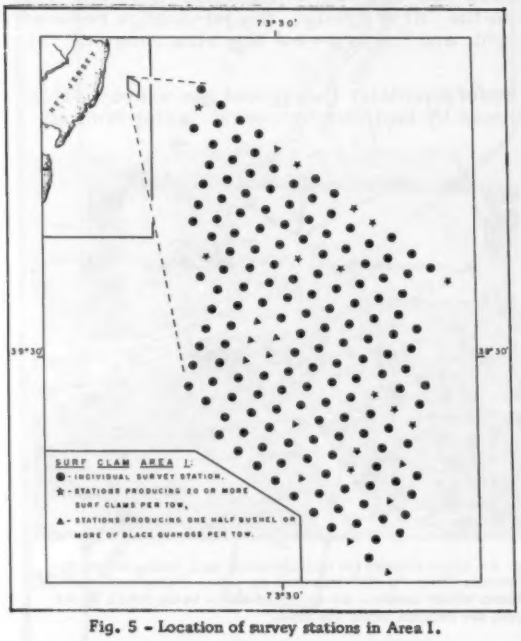

73°30'
39°30'
39°30'
SURF CLAM AREA I:
● - INDIVIDUAL SURVEY STATION.
★ - STATIONS PRODUCING 20 OR MORE SURF CLAMS PER TOW.
▲ - STATIONS PRODUCING ONE HALF BUSHEL OR MORE OF BLACK QUAHOGS PER TOW.
73°30'

Fig. 5 - Location of survey stations in Area I.

Table 1 - Size Distribution of Surf Clams Taken at Selected Sampling Stations in Areas I and IV

Length of Clams		Number of Clams
Millimeters	Inches	Individuals
0-19	0- .7	1
20-39	.8-1.5	11
40-59	1.6-2.3	25
60-79	2.4-3.1	6
80-99	3.1-3.9	8
100-119	3.9-4.7	34
120-139	4.7-5.5	95
140-159	5.5-6.3	391
160-179	6.3-7.0	77

Surf clams of all sizes, except those below three-quarters of an inch long which were too small for the gear to retain, were found in the Area (table 1). This wide variation indicates that populations of various size and age occur in the area. Surf-clam shells in various amounts were taken in almost every tow along with shells of other mollusks.

Black Quahogs: Black quahogs were found with the surf clams in almost all of the tows in which the latter were taken. In Area I they were more abundant than the surf clam, occurring in 170 of the 181 station samples with a maximum catch of over 300 pounds (3.7 bushels) per 5-minute tow. In general, that clam was more concentrated in the southern part of the Area.

AREA IV: Surf Clams: In Area IV, 312 stations were sampled (fig. 6) with much better results than in Area I. Up to 2.8 bushels of surf clams were taken per 5-minute tow; 15 tows produced 1 bushel or more. A catch of 2.8 bushels in five minutes of fishing with a 30-inch dredge would indicate a possible catch of of about 15 bushels per 20-minute tow with a regular 40-inch dredge. Such a yield equals

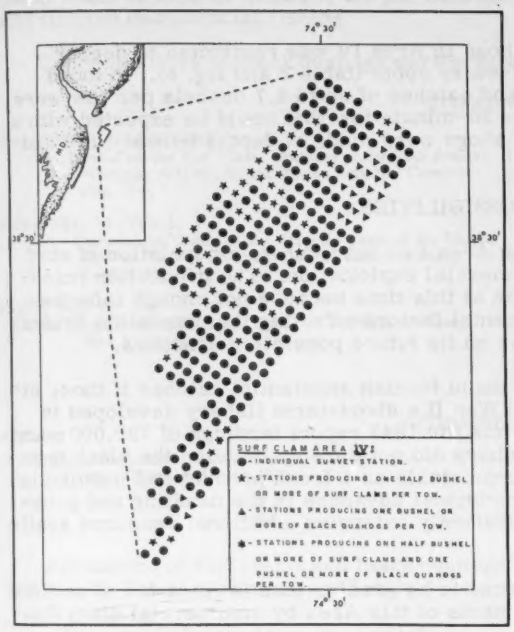

74° 30'
38° 30'
SURF CLAM AREA IV:
- INDIVIDUAL SURVEY STATION.
- STATIONS PRODUCING ONE HALF BUSHEL OR MORE OF SURF CLAMS PER TOW.
- STATIONS PRODUCING ONE BUSHEL OR MORE OF BLACK QUAHOGS PER TOW.
- STATIONS PRODUCING ONE HALF BUSHEL OR MORE OF SURF CLAMS AND ONE BUSHEL OR MORE OF BLACK QUAHOGS PER TOW.

Fig. 6 - Locations of survey stations in Area IV.

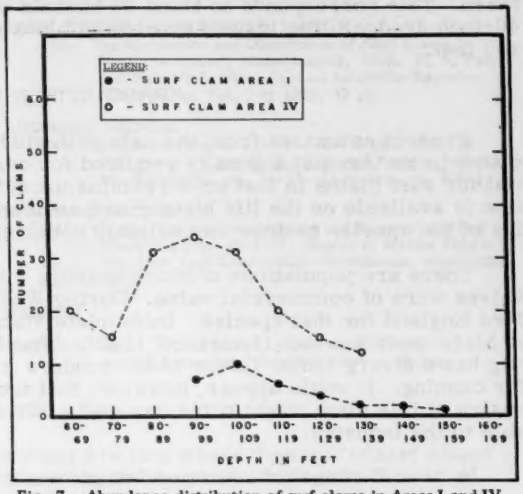


Fig. 7 - Abundance distribution of surf clams in Areas I and IV plotted by 10-foot depth intervals for those stations where this species was caught.

good commercial catches. In this Area, as in Area I, surf clams of all sizes were found within the fishing capabilities of the gear. Best catches were made in depths of 80 to 119 feet but no surf clams were found in depths of over 135 feet (fig. 7 and table 2).

The percentage of sampling stations where surf clams, unmixed with black quahogs, were taken was much greater in Area IV than in Area I. This difference may partly reflect the concentration of sampling effort in

Table 2 - Bottom-Depth Distribution of Surf Clam and Black Quahog Catches in Areas I and IV, Based on 5-Minute Tows and Averaged by 10-Foot Increments

Depth of Water	Number of Surf Clams		Number of Black Quahogs	
	Area I 1/	Area IV 2/	Area I	Area IV
Feet				
60-69	-	20	-	-
70-79	-	15	-	-
80-89	-	31	-	-
90-99	7	33	4	2
100-109	10	31	7	12
110-119	6	21	16	26
120-129	4	15	37	108
130-139	2	12	116	193
140-149	2	-	61	314
150-159	1	-	43	-
160-169	-	-	53	-

1/Area I fished with 20-inch dredge.
2/Area IV fished with 30-inch dredge.

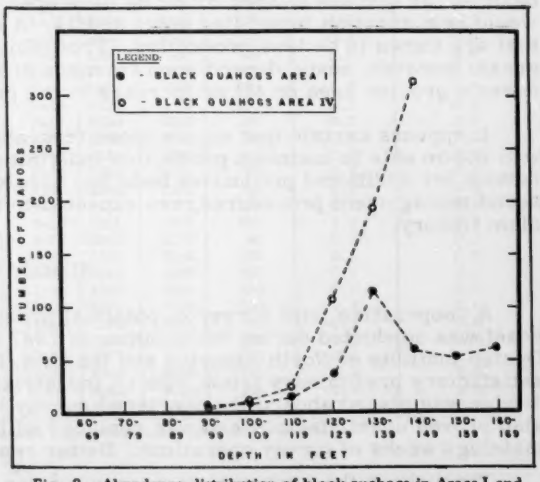


Fig. 8 - Abundance distribution of black quahogs in Areas I and IV plotted by 10-foot depth intervals for those stations where this species was caught.

depths of 110 feet or less. During the survey no black quahogs were found in depths of less than 89 feet; conclusions concerning relative abundance of black quahogs within the two areas, therefore, should not be drawn from these data.

Black Quahogs: The range of the black quahogs in Area IV was restricted to deeper areas in the northeast section and isolated deep-water spots (table 2 and fig. 8). In those spots their concentration was frequently heavy and catches of up to 4.7 bushels per tow were taken. This corresponds to about 30 bushels per 20-minute tow that could be expected with a 40-inch dredge. The largest catches of black quahogs were made at depths between 120 and 150 feet.

PRODUCTION POSSIBILITIES

Present estimates from the data collected in Area I do not indicate a population of surf clams in the Area of a density required for commercial exploitation. The production potential for surf clams in that area remains uncertain at this time because not enough information is available on the life history and environmental factors effecting the population dynamics of the species to draw any reliable conclusion on its future population densities.

There are populations of black quahogs that could furnish substantial catches if those bivalves were of commercial value. During World War II a short-term fishery developed in New England for that species. Incomplete statistics for 1943 report landings of 720,000 pounds of black quahog meats (Loosanoff 1946). That fishery did not develop because the black quahog has a strong iodine flavor which renders it unpalatable as a fresh product and unsuitable for canning. It would appear, however, that technological advances in the handling and processing of this clam might some day make this apparently extensive additional resource available to the industry.

In Area IV the surf clam populations were found to be greater than in Area I, and no doubt good catches of that species could be taken from parts of this Area by commercial clam fishermen.

Two possibilities appear to exist for increasing production from the resources now known or being used. At present the packers prefer clams which measure 5 inches in length but if a suitable process were developed to handle the smaller clams that are found close to the beaches, an inshore fishery might be developed with existing vessels. Such a development would help avert an impending short supply. A second possibility is the harvesting of beds that are known to be less productive. Profitable harvesting of the more sparsely populated areas, however, would depend upon (1) more efficient dredging equipment that can rapidly cover a greater area or (2) an increase in the price of raw clams.

It appears certain that unless more favorable developments are forthcoming the industry will not be able to maintain production indefinitely at or near 1963 levels. Continuing explorations for additional productive beds and accelerated biological research, as a basis for sound management procedures, are expected to assist materially in stabilization of the surf clam fishery.

SUMMARY

A cooperative joint survey of potential production areas for sea clams off the New Jersey coast was conducted during the summer of 1963 by the Sea Clam Packers Association of the Oyster Institute of North America and the U. S. Bureau of Commercial Fisheries. After unsatisfactory preliminary trials with an industrial clam-shell bucket, a small non-hydraulic dredge was placed aboard the chartered survey vessel for sampling purposes. This dredge also proved unsatisfactory and was replaced with a 30-inch hydraulic-jet dredge for the remaining 6 weeks of survey operations. Better results were obtained with the latter equipment.

Throughout the survey a clam-sounder was used. Because of breakdowns during early trials, little information of value was obtained; however, results of considerable potential are indicated, and a redesigned sounder is planned for future work.

Concentrations of surf clams in Area I, off the coast of central New Jersey, were found to be below the level required for commercial utilization; however, the population of surf clams found to date in Area IV, off the Delaware-Maryland coast, appears sufficient to support limited commercial fishing.

Concentrations of black quahogs were greater than surf clam concentrations in both areas.

LITERATURE CITED

CHAMBERLIN, J. LOCKWOOD:
1961. Report on the Surf Clam. Minutes of the 20th Annual Meeting, Atlantic States Marine Fisheries Commission, 1 p.

LOOSANOFF, VICTOR L.
1946. Commercial Clams of the Atlantic Coast of the United States. U. S. Fish and Wildlife Service, Fishery Leaflet 13, 12 pp.

MINER, ROY W.
1950. Field Book of Seashore Life. G. P. Putnam's Sons, New York, New York, 888 pp.

ROPES, JOHN W. and CHARLES E. MARTIN
1960. The Abundance and Distribution of Hard Clams in Nantucket Sound, Massachusetts, 1958. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries No. 354, July 1960, 12 pp.

RUGGIERO, MICHAEL
1961. Equipment Note No. 9--The Surf Clam Fishery of New Jersey. Commercial Fisheries Review, vol. 23, no. 8 (August), pp. 11-13. (Also Sep. no. 626.)

WESTMAN, JAMES R.
1946. On the Origins, Development and Status of the Surf Clam Industry, 1943-45. Bureau of Marine Fisheries, New York Conservation Department, unpublished, 10 pp.

LITERATURE REFERENCE

United States Department of the Interior, Fish and Wildlife Service, Circulars 48 and 109.

Surf Clam Fishery, U. S. Bureau of Commercial Fisheries, Biological Laboratory, Boothbay Harbor, Maine.

APPENDIX

Abundance of surf clams and black quahogs for those stations where the catch of surf clams was one-half bushel or more per 5-minute tow with bearing and depth recordings in Area IV.[1]

Station	Loran Bearing		Depth of Water	Amount of Clams		Station	Loran Bearing		Depth of Water	Amount of Clams	
	1H4	1H5		Surf Clams	Black Quahogs		1H4	1H5		Surf Clams	Black Quahogs
			Feet	(Bushels)					Feet	(Bushel)	
1-12	3368	3104	105	2.0	0.0	5-20	3272	3088	100	0.7	0.0
1-14	3344	3104	75	1.0	0.0	5-24	3224	3088	87	0.7	0.0
1-16	3320	3104	65	0.5	0.0	5-25	3212	3088	82	0.7	0.0
1-17	3308	3104	90	0.9	0.0	6-8	3416	3084	105	0.6	0.1
1-18	3296	3104	95	1.3	0.0	6-14	3344	3084	100	1.8	0.0
2-6	3440	3100	115	0.5	0.0	6-17	3308	3084	75	0.5	0.0
2-8	3416	3100	115	2.1	0.0	7-6	3440	3080	95	0.6	0.0
2-9	3404	3100	105	0.7	0.0	7-7	3428	3080	105	0.6	0.0
2-10	3392	3100	100	0.5	0.0	7-13	3356	3080	100	1.6	0.0
2-11	3380	3100	100	1.7	0.0	7-16	3320	3080	100	0.5	0.0
2-12	3368	3100	95	1.8	0.0	7-17	3308	3080	97	0.7	0.0
3-6	3440	3096	110	0.5	0.0	7-18	3296	3080	95	0.9	0.0
3-9	3404	3096	95	2.1	0.0	7-19	3284	3080	87	0.6	0.0
3-10	3392	3096	80	0.6	0.0	8-11	3380	3076	95	0.8	0.0
3-13	3356	3096	100	1.7	0.0	9-1	3500	3072	90	0.6	0.0
3-17	3308	3096	80	1.5	0.0	9-2	3488	3072	95	0.7	0.0
3-18	3296	3093	100	0.7	0.0	9-13	3356	3072	105	1.2	0.0
4-4	3464	3092	105	0.5	0.2	9-21	3260	3072	80	0.9	0.0
4-7	3428	3092	115	1.2	0.1	10-15	3332	3068	122	0.6	0.0
4-9	3404	3092	110	2.8	0.0	10-18	3296	3068	105	0.5	0.0
4-10	3392	3092	110	0.7	0.0	11-16	3320	3064	120	0.7	0.2
4-12	3368	3092	105	0.8	0.0	11-20	3272	3064	110	0.8	0.0
4-13	3356	3092	95	0.6	0.0	11-28	3176	3064	95	0.9	0.0
4-20	3272	3092	90	0.7	0.0	12-27	3188	3060	130	0.8	1.6
5-1	3500	3088	105	0.7	0.0	12-28	3176	3060	125	0.6	1.8
5-10	3392	3088	105	0.5	0.0	12-29	3164	3060	125	0.8	0.0
5-11	3380	3088	105	1.0	0.0	12-37	3068	3060	105	0.8	0.0
5-19	3284	3088	65	0.5	0.0	13-36	3080	3056	120	0.6	0.0

1/ There were no stations in Area I where the catch came to or exceeded one-half bushel of surf clams per tow.

IDENTIFICATION OF SPECIES IN RAW PROCESSED FISHERY PRODUCTS BY MEANS OF CELLULOSE POLYACETATE STRIP ELECTROPHORESIS

By J. Perry Lane,* Wilma S. Hill,** and Robert J. Learson***

ABSTRACT

A rapid, simple, and relatively inexpensive method--polyacetate strip electrophoresis--has been adapted for identifying species in raw processed fishery products. The method was used to separate the water-soluble proteins in a variety of samples, including drip exuded by products that had been frozen and thawed. The separated protein bands were then stained to establish a band pattern characteristic of each species of fish.

INTRODUCTION

In frozen processed fishery products such as fish blocks, portions, and sticks, it is extremely difficult and, in some cases, impossible to identify, by sensory means, the various species that may be present in the product. The need for identification arises because there often is a cost differential among the species, and a less costly species may be substituted for a more expensive one.

A method used to identify different species is based on electrophoresis. In the electrophoretic technique, an electrical attraction is used to differentially separate muscle proteins. The separation occurs because each type of protein differs in properties such as size and shape of the molecule but primarily because the molecules differ in net electrical charge. The differences in properties cause the protein molecules to migrate towards the electrodes at different rates.

When this technique was applied to the water-soluble proteins of fish, it was found that they gave reproducible characteristic patterns. The separated proteins were then fixed and stained in a supporting medium, such as starch gel, to give a "fingerprint" that is unique for each species.

The separation into band patterns depends on the properties of proteins in their natural state. This means that the sample being identified must not be denatured, as would be the case if the product has been completely cooked. A fully cooked sample cannot be used, but if the central sections of precooked portions are used, the amount of heat received at this point during normal commercial precooking is generally not great enough to denature the protein, so a satisfactory separation can be obtained.

The U. S. Food and Drug Administration was one of the first to apply the electrophoretic technique as an objective method of identifying fish. In 1960, Robert Thompson of that agency reported on a reproducible method of identification by starch gel zone electrophoresis of fish-protein extracts. This method is now employed routinely by the Food and Drug Administration to determine the species involved when substitution is suspected. Since 1962 when this technique was adopted, about 60,000 pounds of fishery products have been seized because of species mislabeling.

Although the Thompson method is reproducible and selective for different species, nonetheless it has several shortcomings that make it difficult for routine use in the field. It is time-consuming, taking 5 hours for electrophoresis alone, and it requires trained laboratory personnel to carry out the procedure.

*Research Food Technologist
**Physical Science Technician (Chemistry)
***Research Chemist
Technological Laboratory, U.S. Bureau of Commercial Fisheries, Gloucester, Mass.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 757

Recognizing these shortcomings, this laboratory has been investigating alternate procedures in an attempt to find or develop a method that is rapid, reproducible, inexpensive, and can be performed by untrained persons with a minimum of instruction. This paper reports on an adaptation of a method that fulfills those requirements.

METHOD

GENERAL: A sample of fish protein is applied to a cellulose acetate strip that serves as a supporting medium through which the proteins can travel. A fixed voltage is applied for a definite length of time. At the end of this period, the strips are stained, washed, and dried to fix the patterns.

PREPARATION OF FISH SAMPLES: Fresh: Approximately 3 grams of meaty portion of fish is ground in a mortar with 3 ml. of water and squeezed through several thicknesses of cheesecloth. If a centrifuge is available, pieces of fish may be placed in centrifuge tubes, and the fluid may be expressed by centrifugation. In this case no added water is required.

Frozen: The sample is thawed, and the drip that forms is used undiluted.

Freeze-Dried: Samples are reconstituted with water and treated in the same manner as the fresh samples.

Breaded Raw Sticks and Portions: The breading is removed by soaking the sticks or portions for a few seconds in water and scraping the breading off with a spatula. The samples are then handled as are the fresh or frozen samples.

Precooked Sticks and Portions: The breading and all surface meat is trimmed until the internal center section remains. This section is then treated as is a fresh sample.

EQUIPMENT: The cellulose polyacetate strips and the electrophoresis cabinet described below are products of the Gelman Instrument Company 1/; similar equipment may be obtained from other sources. The equipment (fig. 1) consists of (1) an electrophoresis cabinet divided into 4 compartments and (2) a constant-voltage power supply with an output potential of 300 volts.

Gelman Applicator
Cellulose acetate strips ($6\frac{3}{4}$" x 1")
Capillary tubes
Filter paper Whatman #1 sheets cut to convenient size

CHEMICALS:

Veronal buffer (pH 8.6 ionic strength 0.05)
- Sodium diethylbarbiturate 10.8 grams
- Diethylbarbituric acid 1.5 grams
- Distilled water to 1000 ml.

Stain
- 200 mg. Ponceau S stain dissolved in 100 ml. 5-percent trichloracetic acid

Wash
- 5-percent acetic acid

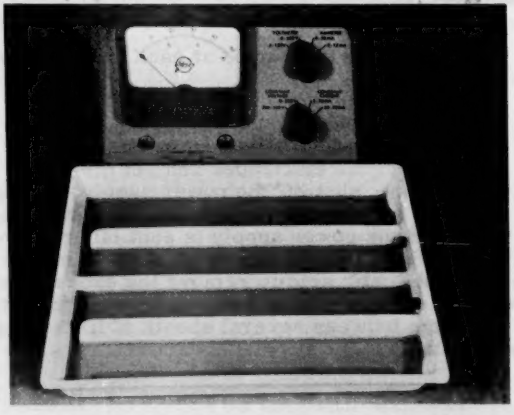


Fig. 1 - Electrophoresis cabinet and power supply.

PROCEDURE: 1. Soak the cellulose polyacetate strips for 30 minutes in the buffer (soaking is required to bring the strips back to their original gel structure). Use a new buffer supply each time. Since 6 strips can be run simultaneously, each with a different sample, identify each strip with a pencil notation before soaking it.

1/ Trade and company names referred to in this publication do not imply endorsement of commercial products.

2. Add chilled (34° F.) buffer to each chamber of the cabinet and level to a point slightly below the compartment dividers.

3. After 30 minutes, remove the strips from the buffer, and gently blot them between sheets of Whatman #1 filter paper.

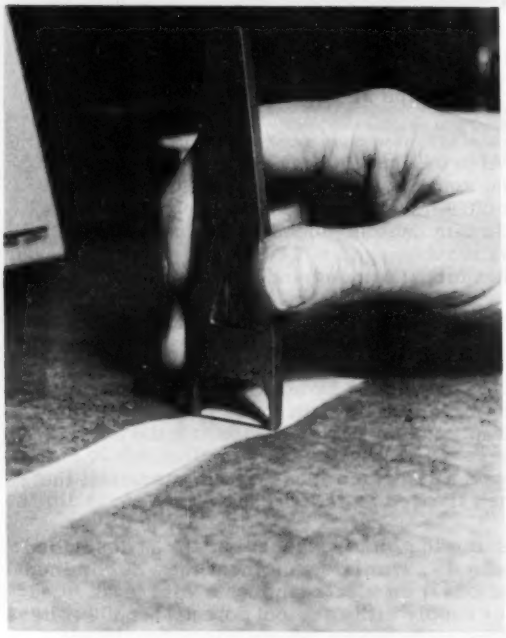


Fig. 2 - Application of sample to acetate strip.

4. Take up a sample of tissue fluid into a capillary tube, and transfer the sample to a special applicator. Draw the capillary tube along the applicator to within $\frac{1}{4}$ inch of both ends. Then press the applicator firmly against the strip about 2 inches from one end (fig. 2). Place the strip containing the sample across the cabinet dividers so that the sample is on the cathode side and both ends are immersed in the buffer in the 2 outer chambers.

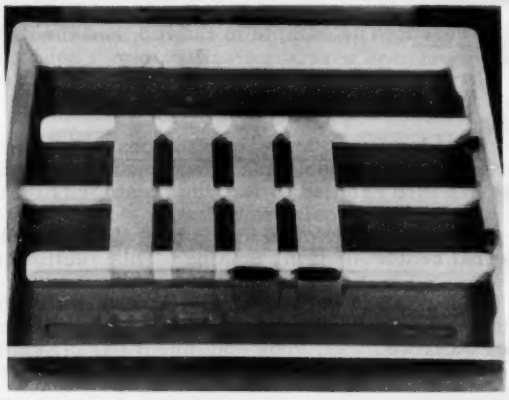


Fig. 3 - Electrophoresis cabinet showing strips secured in place.

Secure the acetate strips at each end with magnets or glass wedges to prevent slippage. Keep them taut (fig. 3).

5. Put the cabinet cover in place.

6. Connect the electrodes and set the power supply at 300 volts for 30 minutes. At the end of this time, shut off the power supply.

7. After the power supply is shut off, remove the strips from the cabinet, and place them in Ponceau S stain for 5 minutes. Then immerse the strips in a series of 3 rinsing solutions of 5-percent acetic acid to remove the excess dye. Rinse the strips until only the protein bands are left stained and the remainder of the strip is free from dye. Finally, blot the strips and dry them between several sheets of filter paper. Once the strips are completely dry, they may be retained as a permanent record.

RESULTS

Three or more samples each of ocean catfish, cod, cusk, haddock, ocean perch, pollock, and whiting were analyzed at separate times with consistent results. This method was also used for identifying (a) 122 samples of drip, (b) 26 samples in the dehydrated and precooked states, and (c) approximately 30 samples submitted by the inspection service. The results were verified by running known samples along with the unknown samples and comparing the patterns. Also, the accuracy of this method was confirmed by running duplicate samples, using other techniques.

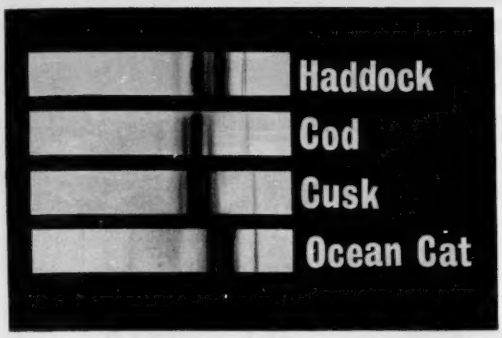


Fig. 4 - Typical acetate patterns from four different species.

Figure 4 illustrates the different patterns obtained from 4 common local species of fish.

CONCLUSIONS

This method of fish-species identification has several advantages over other electrophoretic methods in use:

1. It is more rapid, requiring only 45 minutes to complete after the strips have been soaked.

2. The reagents for the buffer, rinse solutions, and dye can be obtained premeasured from most chemical supply houses and require only dilution to volume.

3. The techniques are relatively simple; any person who is willing to exercise care can be readily trained to perform this analysis.

The cost of the basic equipment, including the power supply, ranges from about $150-$250, depending on the source. At the present time, the Bureau of Commercial Fisheries Technological Laboratory at Gloucester is investigating the possibility of reducing the cost of the cabinet equipment by using readily available materials to fabricate a homemade unit.

In the future, the possibility of species substitution in processed fishery products will undoubtedly be scrutinized more closely by regulatory agencies. It will, therefore, be to the advantage of a producer working with raw materials that have already been processed to some degree to have at his disposal a rapid, reliable method for determining the species in such products. First of all, such a method will ensure that he is receiving the species for which he is paying; secondly, it will preclude the possibility of conflict with regulatory agencies over the question of species when the finished product bearing the processor's name reaches the market place.

The use of the polyacetate strip electrophoresis technique provides a rapid and reliable method for doing this. It has the further advantage of being simple enough to permit application by those untrained in laboratory procedures.

REFERENCES

THOMPSON, R. R.
1960. Species Identification by Starch Gel Zone Electrophoresis of Protein Extracts. Journal of Association of Official Agricultural Chemists, vol. 43, p. 763.

GELMAN INSTRUMENT COMPANY
1964. Instructions with Sepraphore III Rapid Electrophoresis Manual 51199-B. June. The Gelman Instrument Company, Ann Arbor, Michigan.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

TRENDS AND DEVELOPMENTS

A METHOD OF FORECASTING THE RELATIVE ABUNDANCE OF NORTHERN SHRIMP (Pandalus borealis Kr.) IN MAINE WATERS

By R. L. Dow*

Northern shrimp (Pandalus borealis Kr.) concentrated on spawning grounds of Maine inshore waters have been fished commercially each year since the 1937/1938 spawning season. Spawning activity reaches a peak during February and March, although commercially attractive schools have been found in some years as early as October and as late as June.

Table 1 - December Sea Water Temperatures and Shrimp Landings Two Years Later

Spawning Year	Temperatures °F.	Shrimp Landings 1,000 Lbs.	Catch Year
1953/54	48.4	0	1955/56
1954/55	46.6	0	1956/57
1951/52	46.2	0	1953/54
1950/51	45.9	38	1952/53
1956/57	44.8	11	1958/59
1949/50	44.3	104	1951/52
1952/53	43.7	0	1954/55
1957/58	42.8	90	1959/60
1948/49	42.5	45	1950/51
1960/61	42.1	529	1962/63
1959/60	41.9	340	1961/62
1937/38	41.7	8	1939/40
1962/63	41.5	2,068	1964/65
1946/47	41.3	10	1948/49
1961/62	41.2	898	1963/64
1958/59	41.0	64	1960/61
1955/56	40.8	5	1957/58
1943/44	40.1	162	1945/46
1947/48	40.0	7	1949/50
1940/41	39.7	292	1942/43
1941/42	39.5	389	1943/44
1944/45	39.2	194	1946/47
1935/36	37.9	83	1937/38
1942/43	37.4	554	1944/45
1938/39	37.3	54	1940/41
1936/37	36.0	18	1938/39
1939/40	33.7	79	1941/42
1945/46	31.1	27	1947/48

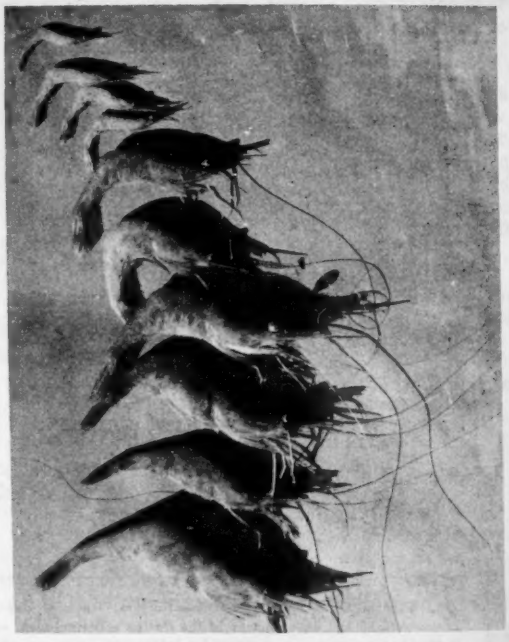


Fig. 1 - Northern shrimp (Pandalus borealis Kr.)--the smaller sizes are discarded.

Shrimp abundance has been associated with sea water temperatures during the period of spawning two years preceding their entry into the fishery (Dow 1963). This association includes all months from October through July. Typical of the association is the record shown in table 1 of December sea water temperatures as measured at Boothbay Harbor by the U. S. Fish and Wildlife Service and landings of shrimp during the fishing season two years later.

*Research Director, Department of Sea and Shore Fisheries, Augusta, Maine.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 758

Table 2 - Temperature Ranges by Months and Shrimp Landings Two Years Later

Month	Temp. Range °F.	Shrimp Landings 1,000 Lbs.	Catch Year
October	53.2-57.6	0	1953/54 & 1954/55
November	49.7-51.3	0	1955/56 & 1956/57
December	42.5-48.4	5	1957/58
January	39.6-43.0	7	1949/50
February	37.0-41.9	10	1948/49
March	39.4-43.0	11	1958/59
April	44.4-45.5	38	1952/53
May	50.4-52.2	45	1950/51
June	56.5-57.9	90	1959/60
July	61.5-63.4	104	1951/52
October	49.2-52.8		
November	44.8-48.6	340	1961/62
December	37.4-42.1	529	1962/63
January	32.8-39.0	2,068	1964/65
February	32.0-36.3	898	1963/64
March	33.6-38.3	292	1942/43
April	37.0-43.5	162	1945/46
May	46.0-50.0	194	1946/47
June	52.9-56.3	389	1943/44
July	55.5-60.8	554	1944/45
October	48.0-		
November	43.8-39.3	83	1937/38
December	37.3-31.1	79	1941/42
January	31.4-	64	1960/61
February	31.7-29.1	54	1940/41
March	32.3-30.0	27	1947/48
April	36.2-34.6	18	1938/39
May	44.4-43.8	8	1939/40
June	52.7-49.8		
July	-		

Fig. 2 - Unloading northern shrimp at a Maine processing plant.

Within the October-July period, various temperature ranges are associated with varying levels of shrimp abundance and availability two years later, as indicated by landings of this intensive winter fishery. Monthly temperature ranges of the period and shrimp landings within the ranges are summarized in table 2. In general, the greatest abundance is associated with the upper half of the optimum temperature range, while the least abundance is associated with the highest temperature and the greatest fluctuations in temperature. Intermediate levels of abundance are associated with low and intermediately high temperatures.

Fig. 3 - Hand peeling and processing of northern shrimp.

Fig. 4 - Northern shrimp come off peeling machine in a Maine processing plant.

The consistent association of medium-range sea water temperatures with the years of greatest shrimp abundance, of high ranges and unusual fluctuations with zero to low abundance, and of low or intermediately high ranges

with intermediate abundance, suggests that sea water temperature measurements made at Boothbay Harbor during the spawning year can be used to predict the relative abundance of commercial-size shrimp during the fishing season two years later.

REFERENCE

DOW, ROBERT L.
1963. "Fluctuations in Maine Shrimp Landings," Commercial Fisheries Review, vol. 25, No. 4 (April). (Also Sep. No. 673.)

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 19--
TRAWL COD-END CLOSING DEVICE:

Recently, several new types of cod-end closing devices, "Holland Clip," "Nautilus Clip," and a two-armed clip (produced by the firm Maskinfabrik Iras in Denmark) have made their appearance (Fishing News International 1965). The "Holland Clip" is being used by British bottom, herring, and sprat trawlers (Fishing News International 1964). During 1965, the "Holland Clip" was tested successfully aboard two U. S. Bureau of Commercial Fisheries chartered trawlers, the Western Flyer and St. Michael.

Most Pacific northwest trawl fishermen now use a puckering string tied closed by a hangman's knot. This knot rarely comes untied while fishing, yet it does have two disadvantages: (1) The larger the catch, the more difficult the knot is to release; sometimes three men are required to pull open the knot. (2) Time is lost when splitting large catches aboard the vessel since the knot must be retied after each split is dumped.

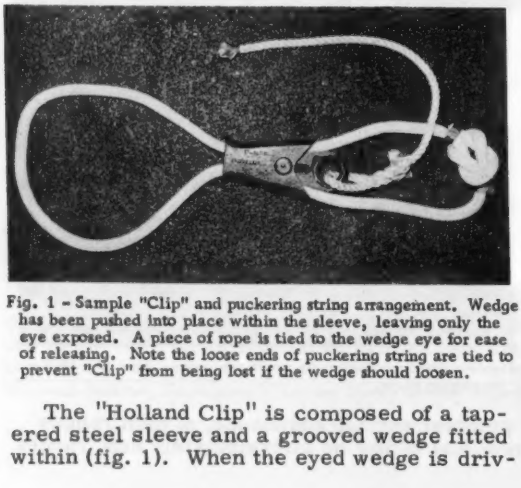


Fig. 1 - Sample "Clip" and puckering string arrangement. Wedge has been pushed into place within the sleeve, leaving only the eye exposed. A piece of rope is tied to the wedge eye for ease of releasing. Note the loose ends of puckering string are tied to prevent "Clip" from being lost if the wedge should loosen.

The "Holland Clip" is composed of a tapered steel sleeve and a grooved wedge fitted within (fig. 1). When the eyed wedge is driven into the sleeve, it binds against a braided nylon puckering string. To release the "Clip," the wedge is pulled out of the sleeve. A short rope tied to the wedge eye facilitates pulling the wedge. The puckering string ends are tied together and seized to prevent them from coming free of the "Clip."

Twist rope was used with the "Clip" aboard the trawler St. Michael. On several occasions after the wedge was released, the rope caught between the wedge corner and the sleeve. This caused the rope to untwist and not pull freely through the sleeve.

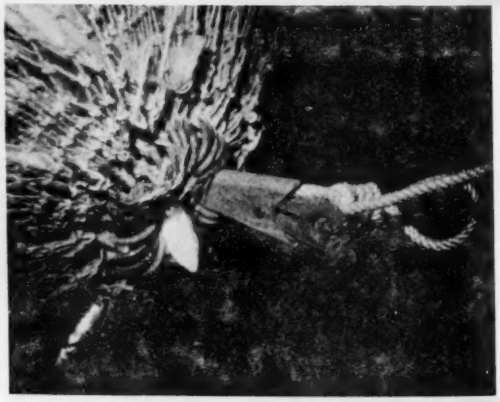


Fig. 2 - Underwater view of "Holland Clip" and closed cod end containing 15,000 pounds of hake. The loosely tied hangman's knot prevents the wedge from releasing accidentally while the net is being set.

On two occasions aboard the trawler Western Flyer, the wedge fell free when no strain was placed on the puckering string as the net was set. This difficulty was eliminated by tying either a loose slip knot or hangman's knot in the free end of the puckering string (fig. 2). This knot was removed easily when the first split came onboard since no strain

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 759

was placed on it regardless of the catch size. The "Clip" was used without a knot during all subsequent splits of the tow.

Catches of up to 60,000 pounds were made during 170 experimental tows by the trawler Western Flyer. As many as 40 splits were required to bring large catches aboard. Hake were dumped into the hold at a rate of about 1,000 pounds a minute during splitting with the "Holland Clip." Comparing this device with the usual method of tying the puckering string when splitting, it is believed that a time saving of over 30 percent per split was made. Almost three splits could be made using the "Holland Clip" in the same time required to made two splits using the hangman's knot. Time saved amounted to nearly two days during the experimental fishing period.

LITERATURE CITED

FISHING NEWS INTERNATIONAL
1964. Cod-End Clip. Fishing News International, vol. 3, no. 4, p. 351.

1965. Cod-End Clips. Fishing News International, vol. 4, no. 3, pp. 350, 353.

--By William W. High,
Fishery Methods and Equipment Specialist,
Exploratory Fishing and Gear Research Base,
U. S. Bureau of Commercial Fisheries,
Seattle, Washington

Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, DECEMBER 1965:

U.S.S.R.: At year's end about 85 Soviet vessels were involved in ocean perch trawling in the Gulf of Alaska as compared with 15 vessels at the end of 1964. The eastern Gulf continued to be the area of greatest Soviet activity with nearly 70 vessels divided into two nearly equal fleets. One fleet remained fishing the grounds generally west of Yakutat Bay throughout December, after the second split away late in the month and moved again to the area west of Cape Ommaney off Southeast Alaska.

About mid-December, the Soviets reported that bad weather in the Aleutian Islands area prompted shifting of their trawling efforts to the Chirikof Island region southwest of Kodiak Island. By month's end at least 15 trawlers, mostly BMRT factory trawlers, were believed to be fishing between Chirikof and the Shumagin Islands.

Soviet trawling in the central and western Aleutians dropped off to about five BMRT factory trawlers following the transfer of other such vessels to the Gulf of Alaska.

During December, 2 more SRT-M trawlers joined the Soviet shrimp fleet in the Gulf of Alaska, making a total of at least 10 such vessels in that fishery. A group of about 5 of those trawlers was operating east of the Trinity Islands off southwest Kodiak Island. The remaining 5 vessels were working near the Shumagin Islands.

The Soviets indicated vessels were being dispatched to the 1965/66 herring expedition in the central Bering Sea. In past years more than 150 Soviet vessels engaged in that fishery, which is centered generally northwest of the Pribilof Islands.

Japan: Japanese trawling efforts in the Gulf of Alaska involved 4 factory trawlers by the end of December after 2 of the vessels had briefly returned to Japan. One trawler fished south of Unalaska Island just west of Unimak Pass and the others continued to concentrate on the Albatross Bank region off southwest Kodiak Island. Early in 1966, two additional trawlers were scheduled to join the Japanese Gulf fleet.

One factory trawler and a side trawler fished throughout the month in the western Aleutians. A second factory trawler which had been fishing in the area returned to Japan for repairs, but was scheduled to rejoin that fishery in early January.

A factoryship accompanied by 6 trawlers left Japan early in December for the eastern Bering Sea. By mid-month the fleet was fishing just north of Unalaska Island. That fleet was believed to be primarily seeking Pacific ocean perch and possibly Alaska pollock.

* * * * *

SITKA TO HAVE NEW HARBOR:

Sitka will have a new harbor for its growing fishing fleet in 1966. The job is being done under a $1,076,000 U. S. Army Corps of Engineers contract. Work began in July 1964 and was scheduled for completion by January 1, 1966. The new harbor will have an area of 16 acres and provide space for 450 fishing craft.

* * * * *

KODIAK KING CRAB FISHERY:

King crab fishermen in Kodiak found it increasingly difficult during December to unload their crab catches at Kodiak canneries. Some vessels experienced nearly delays of two weeks between catch and delivery. Cannery operators attributed the problem to a combination of factors. The current season had the advantage of fine weather and catches were exceptional. However, Kodiak lacks sufficient electrical power to operate all of the canneries at full capacity. Compounding the problem further was the shortage of cannery workers.

* * * * *

VESSEL TAXATION CHANGE PROPOSED:

The League of Alaska Cities recommended to Senator Hansen that the vessel tonnage taxation law be repealed. The law allows for taxing vessels by tonnage, with a maximum tax of $15. It would be replaced by a value proportion assessment on the vessel's fair market value. The law could mean a tax increase of $50 to $1,000 a year for each resident Alaskan boat owner. Those hardest hit by the proposed tax would be vessel owners who are replacing gear lost in the earthquake.

Alaska Fishery Investigations

FOOD HABITS AND BEHAVIOR OF SALMON FRY:

Over 200 stomachs of pink and chum salmon fry collected in 1965 were examined as part of a U. S. Bureau of Commercial Fisheries investigation of food habits, food availability, and behavior of fry at Traitors Cove. Some of the most important food items are: copepods, barnacle nauplii, barnacle cyprids, and cladocerans. An intertidal species of the insect order Collembala and dipterans, mostly chironomids, were important in some collections. In May 1965, fry were confined in a one-meter plankton net at Traitors Cove to study digestion rates. Stomachs of fish thus deprived of food were emptied in about six hours. The average number of food organisms found in "full stomachs" was about 60 indicating that on the average each fish consumed about 240 organisms a day. Zooplankton densities in June 1965 amounted to 40 organisms per liter in the outer bay. Therefore, only 6 liters of water contained a one-day supply of food for one fish. This relationship between food abundance and demand suggests that zooplankton density was not an important factor in determining movement, distribution, and survival of fry at that time. A fry and plankton sampling program will be designed for the 1966 field season to further explore relationships between food availability and salmon fry.

* * * * *

RED SALMON FRESH-WATER SURVIVAL RATES LOW IN KARLUK:

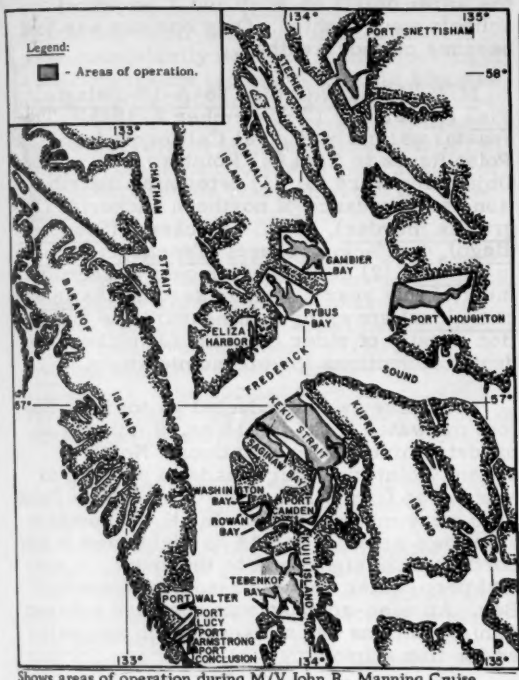
Analyses of red salmon egg-to-smolt survival data for the Naknek and Karluk systems show that for the 4 brood years 1958 through 1961, average survival rate for Karluk was about 0.31 percent while for the same period in the Naknek system, the survival rate from egg to smolt was about 0.75 percent. The average potential egg deposition for Karluk was 561 million and for Naknek 1,504 million eggs. The lower survival rate in the Karluk system is of particular interest because the lake appears to be much higher in basic productivity than the Naknek lakes. Studies to explain this phenomena and to relate it to optimum red salmon production are continuing.

Alaska Fisheries Explorations and Gear Development

SHRIMP RESOURCES AND GEAR EFFICIENCY STUDIED:

M/V "John R. Manning" Cruise 65-3 (October 4-December 9, 1965): Gear research on shrimp pot efficiency and design was conducted during a 9-week cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John R. Manning. Objectives were to: (1) test fish effectiveness of 7 types of shrimp pots, (2) locate commercial quantities of shrimp, and (3) obtain data on distribution and abundance of spot shrimp (Pandalus platyceros).

The 7 experimental shrimp pots were fished by the long-line method. Six of the pots were constructed with metal frames covered with $1\frac{1}{2}$"-nylon web. Included were a cubical 6-tunnel pot, a rectangular 2-tunnel pot, a cubical galvanized 4-tunnel pot, 2 triangular pots, and a collapsible circular pot. The 7th type was a rectangular pot constructed of wooden slats with web tunnels at each end.



Shows areas of operation during M/V John R. Manning Cruise 65-3 (October 4-December 9, 1965).

Each long line consisted of a large surface buoy, a buoy line, anchor, and a 40-fathom groundline. One of each type pot was attached to the groundline by 1-fathom dropper lines at 5-fathom intervals. The position of the pots on the groundline was randomly predetermined for each string. Alternate strings were furnished with a recording thermometer.

Echo-soundings were made at each station to determine if the bottom was trawlable. A standard 40-foot Gulf of Mexico shrimp trawl made 13 drags. Twelve pounds of spot shrimp were taken in 3 drags made in Eliza Harbor.

A total of 350 strings of pots was set in the inside waters and bays along Stephens Passage, the north and west sides of Kuiu Island and the southeastern side of Baranof Island (chart). A total of 147 pounds of spot shrimp was taken averaging 22 count (heads on). This was primarily a gear research cruise, concentrated in areas where industry reported locations of spot shrimp. More stations were made in the Keku Strait and Tebenkof Bay areas of Kuiu Island, where 90 percent of the total catch of spot shrimp was taken.

Preliminary analysis of the data indicates the wooden pots were more efficient than the other six pot types. Future work is being planned to obtain more data needed to substantiate the results.

Note: See Commercial Fisheries Review, Dec. 1965 p. 25.

California

FALL 1965 PELAGIC FISH POPULATION SURVEY:

M/V "Alaska" Cruise 65-A-9-Pelagic Fish (October 14-November 3, 1965): The inshore waters, offshore islands, and banks of southern California between Coal Oil Point and the U. S.-Mexican border were explored during this cruise by the California Department of Fish and Game research vessel Alaska.

The objectives were to: (1) determine the distribution and abundance of northern anchovies (Engraulis mordax), jack mackerel (Trachurus symmetricus), Pacific mackerel (Scomber diego), and Pacific sardines (Sardinops caeruleus); (2) make two deep tows to obtain reference collections of bathypelagic species for the proposed Food Habits Study to be conducted under the Bartlett Bill; (3) conduct several daylight fathometer runs to obtain information on fish school distribution using the Westrex Precision Depth Recorder (PDR), model Mark XV; and (4) continue the evaluation of the 30-foot midwater trawl as a sampling tool.

The midwater trawl, blanketnet, and echo-sounder were the tools used. The larger trawl net (50-foot mouth opening) was used for deep tows and the smaller (30-foot) was used for shallower tows. Eighty-six percent of all tows were shallow, i.e. the bottom of the net was less than 70 feet below the surface. A total of 42 trawl and 44 night-light/blanketnet stations were occupied.

Daylight echo-sounding runs were made on four occasions to locate and count fish schools. No species identification was made of the schools. The largest number of schools was found off the Los Angeles-Long Beach Harbor in water less than 50 fathoms deep.

NORTHERN ANCHOVY: Anchovies were captured in 62 percent of all tows made. Inshore waters, within 5 miles of the mainland, were most productive with 90 percent of the tows successful. Only 36 percent of the tows made in offshore waters and near the offshore islands were successful. The largest fish were caught in the Port Hueneme and offshore areas. Nearly all the anchovies caught in those areas were large adults; gravid females were captured in two offshore tows. Large numbers of pinhead anchovies were found in the Santa Monica Bay area and near La Jolla.

The night-light was not as effective as the trawl in obtaining anchovy samples. Of 44 stations made, anchovies were attracted at 16, or 36 percent, and samples were collected at 3.

The night-light was surprisingly successful in attracting pinhead anchovies in the clear, blue oceanic waters off the coast between Dana Point and La Jolla. Anchovies caught at light stations averaged 129 fish a pound in Santa Monica Bay and 40 fish a pound off Port Hueneme, about the same as those caught by the trawl in these areas.

PACIFIC AND JACK MACKEREL: One Pacific mackerel was caught by hook and line at a light station near San Clemente Island. Jack mackerel were caught at nine stations, eight trawl and one light. The largest catch was 50 jacks caught with the trawl near San Clemente Island. Jacks were 11 to 154 quarter centimeters (4.3-15.2 inches) long.

PACIFIC SARDINE: No sardines were seen or captured during this cruise.

MISCELLANEOUS: Two tows at depths over 200 fathoms were made to obtain reference material of bathypelagic species for the proposed Food Habits Study. About 5,600 fish of 28 species were taken. Pacific hake (Merluccius productus) were caught in one of the tows in the Santa Barbara channel.

Two sets of tows in identical areas and depths were made to compare the effectiveness of the two different-sized trawl nets. Because of the time involved in changing nets and bridles the two nets could not be used the same night. The catch of anchovies was essentially the same for each net.

Sixty miles were scouted at night for fish schools, but due to poor bioluminescene in the water only 1 anchovy and 3 mackerel schools were sighted. Only one day was lost because of poor weather.

M/V "Alaska" Cruise 65-A-10-Pelagic Fish (November 12-December 2, 1965): The coastal waters of central California from Point Reyes to Coal Oil Point were surveyed. Objectives were to: (1) determine distribution and abundance of northern anchovies (Engraulis mordax), Pacific mackerel (Scomber diego), and jack mackerel (Trachurus symmetricus); (2) determine amount of recruitment of this year's Pacific sardine (Sardinops caeruleus) spawning and measure the population density of older fish; and (3) make incidental collections for taxonomic study.

The survey was conducted by towing a 30-foot midwater trawl for 15 or 30 minutes at predetermined fishing stations. North of Pigeon Point tows were made in daylight to avoid crab fishing gear; south of Pigeon Point tows were made at night. In all, 43 comparable tows were made: 14 daylight tows in the north, and 29 night tows to the south. A special deep-water tow was made in Monterey Bay. An echo-sounder was operated between fishing stations and a visual watch maintained for fish schools.

Much time was lost due to severe weather conditions. Extensive concentrations of jellyfish and salps made shortening most tows to 15 minutes necessary to prevent net damage.

NORTHERN ANCHOVY: Anchovies dominated the catch. Catches were poor in daylight tows north of Pigeon Point, and few concentrations were detected by visual or electronic means. Only 1 adult anchovy and a small quantity of larvae were caught on the 14 stations fished here.

Anchovies were caught in 26 of the 29 night tows made south of Pigeon Point, in numbers ranging from 1 to 3,500 fish. Seventy-eight percent of the catches contained 200 fish or less. The best catches were made between Pfeiffer Point and San Simeon; the echo-sounder also detected the largest number of schools in that area. The anchovy catch consisted almost entirely of large adults averaging approximately 135 mm. (5.3 inches) standard length.

Gonads were examined but no evidence of spawning activity was detected. Night-schooling behavior quite different than found in more

southern waters was indicated by echo-sounder traces. Well-defined compact schools were consistently detected; continuous light scattered traces typical at night in Mexican and southern California waters were almost completely lacking. Compared with this year's surveys in Mexican and southern California waters, anchovies in central California appeared to be less numerous but much larger.

OTHER ACTIVITIES: Only 1 small jack mackerel was taken and no Pacific mackerel or sardines were seen or captured. Other species appearing in the trawl catches included northern midshipmen (Porichthys notatus) and California pompano (Palometa simillima). The special deep tow caught a variety of deep-sea fish consisting chiefly of lanternfish (family Myctophidae).

Sea surface temperatures ranged from 14.1° C. (57.4° F.) near Point Reyes to 16.4° C. (61.5° F.) at Coat Oil Point. The Davidson Current was evidenced by warm water, averaging about 14.7° C. (58.5° F.), north of Point Arguello. A series of storms accompanied by gale-force winds prevented a more thorough survey of the area.

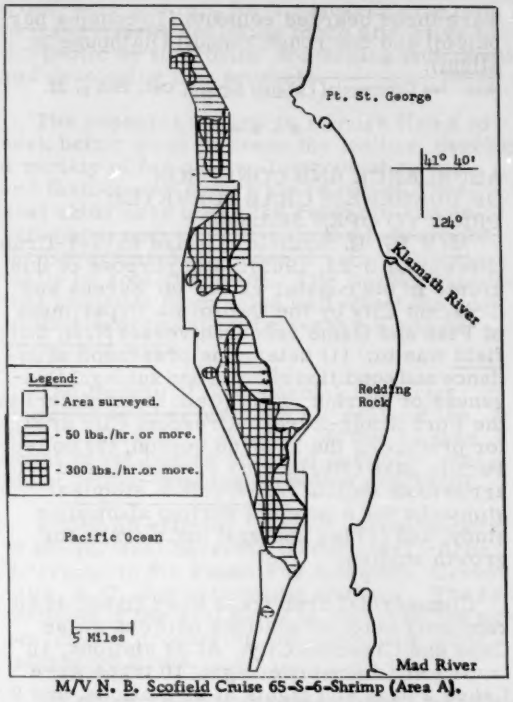
Note: See Commercial Fisheries Review, Jan. 1966 p. 18.

* * * * *

SURVEY OF SHRIMP RESOURCES IN COASTAL WATERS CONTINUED:

M/V "N. B. Scofield" Cruise 65-S-6-Shrimp (September 27-October 22, 1965): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield in the coastal waters off Eureka and Crescent City were to: (1) Sample randomly concentrations of pink shrimp (Pandalus jordani) for determining population estimates and natural mortality rates, (2) determine sizes, sexes, and weights of shrimp; (3) save rare or unusual invertebrates and fish for various collections and the State Fisheries Laboratory, Terminal Island; and (4) collect stomachs from Pacific hake (Merluccius productus) and arrowtooth halibut (Atheresthes stomias) for relative abundance studies of juvenile shrimp.

Three steps of 39 tows each were completed. The tows from each step were distributed at random over the 270-square-mile survey area between the mouth of Mad River and the Oregon border. The average distance of each tow was ½ mile and covered



M/V N. B. Scofield Cruise 65-S-6-Shrimp (Area A).

an area of 75,950 square feet (with a net opening of 25 feet). Fishing depths ranged from 38 to 108 fathoms. A semiballoon Gulf of Mexico shrimp trawl with 41-foot headrope and 1-inch stretched mesh was used. A ½-inch stretched mesh liner was used in the cod end to prevent escapement of 0-age shrimp.

The 270-square-mile survey area included 171 square miles where 50 or more pounds of shrimp could be caught per hour. It was found that 300 or more pounds per hour (commercial concentration) could be caught in an area of 60 square miles.

The average catch of shrimp per hour, excluding yields under 34 pounds per hour, was 352 pounds (heads on), and ranged from 34 to 1,831 pounds. An estimated 4.6 million pounds of shrimp remain on the bed. The count per pound ranged from 89 to 608, with a mean of 156.

The stomachs of 191 Pacific hake were examined for shrimp and 85 arrowtooth halibut stomachs were collected for examination in the laboratory. Among specimens collected

were three bearded eelpouts (Lyconema barbatum) and one rough ronquil (Rathbunella alleni).

Note: See Commercial Fisheries Review, Oct. 1965 p. 22.

* * * * *

ABUNDANCE AND CONDITION OF DUNGENESS CRAB SURVEYED PRIOR TO OPEN SEASON:

M/V "N. B. Scofield" Cruise 65-S-7-Crab (November 3-24, 1965): The purpose of this cruise in the coastal waters off Eureka and Crescent City by the California Department of Fish and Game research vessel N. B. Scofield was to: (1) determine preseason abundance and condition of legal and sublegal Dungeness or market crabs (Cancer magister) in the Fort Bragg-Eureka-Crescent City area for predicting the 1965/66 season; (2) collect Pacific hake (Merluccius productus) and arrowtooth halibut (Atheresthes stomias) stomachs for a juvenile shrimp abundance study; and (3) tag sublegal male crabs for growth studies.

Commercial crab traps were fished at 50 randomly selected stations between False Cape and Crescent City. At 29 stations, 10 traps were fished overnight, 10 traps were fished 2 days and nights at 19 stations, and 9 traps were fished at one station overnight, and at 1 station for 2 days and nights. Bad weather prevented taking of samples north of Crescent City and in the Fort Bragg area.

Shoulder widths of crabs were recorded for the entire catch. Shell condition determinations were made for all male crabs. Sublegal male crabs were tagged with suture tags and released between False Cape and Trinidad.

Trawling for Pacific hake and arrowtooth flounder was not possible due to poor weather.

Two of the 500 traps set were lost and 1 was severely damaged. The remaining 497 traps caught 14,792 crabs, including 12,013 legal males ($6\frac{1}{4}$ inches in breadth or greater), 2,746 sublegal males, and 33 females. The adjusted average catch per trap a day was 20.0 for legal and 4.9 for sublegal male crabs.

The False Cape-Trinidad area averaged 22.3 legal and 8.2 sublegal crabs per trap and Patricks Point-Crescent City area 17.8 legal and 1.7 sublegal crabs. The highest station catch (41.4 legal males per trap) was recorded southwest of Trinidad.

The legal crabs were in poorer condition than in the previous season. Overall, 20.5 percent of the legals were soft, compared with 7 percent during the 1963/64 season.

Mating marks were noted on 6.5 percent of the sublegal and 0.3 percent of the legal males. None of the females was gravid.

Based on preseason surveys and season catches for the past 2 years, and this year's survey, the total crab catch for the Fort Bragg-Eureka-Crescent City area should fall between 6.7 and 6.9 million pounds. This would exceed the 20-year average of 6.2 million pounds for the first time since 1961.

A total of 257 sublegal male crabs were tagged and released between False Cape and Trinidad.

Note: See Commercial Fisheries Review, February 1966 p. 15.

Cans--Shipments for Fishery Products, January-November 1965

A total of 2,796,426 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-November 1965 as compared with 2,592,360 base boxes used during the same period in 1964. In 1965, there were increases in the U. S. canned pack of Maine sardines and Gulf shrimp.

Note: Statistics cover all commercial and captive plants known to be producing metal cans A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES OF FRESH AND FROZEN FISHERY PRODUCTS, NOVEMBER 1965:

Armed Forces purchases of fresh and frozen fishery products for most major items in November 1965 were generally higher then in November 1964. Purchases were up substantially for flounder fillets, haddock fillets, ocean perch fillets, scallops, oysters, and shrimp.

Principal Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, November 1965 with Comparisons

Product	Nov. 1965		Nov. 1964	
	Qty. Lbs.	Avg. Cost Cents/Lb.	Qty. Lbs.	Avg. Cost Cents/Lb.
Shrimp:				
raw headless	132,800	96	96,150	97
peeled and deveined	292,300	133	240,288	133
breaded	367,400	89	341,550	88
molded and breaded	52,928	67	26,300	64
Total shrimp	845,428	104	704,288	104
Scallops	225,600	70	165,200	72
Oysters:				
Eastern	110,087	127	63,340	110
Pacific	26,050	88	26,396	74
Total oysters	136,137	120	89,736	100
Clams	-	-	12,630	35
Cod fillets	37,300	38	23,400	33
Flounder fillets	318,900	42	161,800	31
Ocean perch fillets	372,600	34	259,250	29
Haddock fillets	165,955	40	114,760	33
Haddock portions	52,500	50	131,500	49
Halibut steaks	39,400	63	73,950	48
Salmon steaks	11,375	70	21,110	72
Swordfish steaks	450	68	3,761	58

Compared with the same month in 1964, prices in November 1965 were up for flounder fillets, ocean perch fillets, and haddock fillets.

Fur Seals

INTERIOR DEPARTMENT ISSUES NEW PROPOSALS FOR IMPROVED PROCESSING TECHNIQUES OF ALASKA SKINS:

A second invitation to firms interested in research and development in the processing of Alaska fur seal skins was issued December 14, 1965, by the U. S. Department of the Interior. The invitation responded to interest expressed by processors who were unable to reply prior to the closing date for the previous invitation issued in early 1965.

Firms submitting acceptable proposals were to be asked to process sample seal skins to demonstrate their capabilities of performing more extensive research and development work with proposals to be submitted to Interior's Bureau of Commercial Fisheries by January 31, 1966. There are sufficient raw seal skins to support only a very limited number of new research contracts.

In September 1965, the Pierre Laclede Fur Company, St. Louis, Mo., was awarded a one-year contract for a research program to make Alaska sealskins more attractive to the public by improving processing techniques and developing new products.

The research contracts require firms to seek better ways to dress the leather, develop a variety of fur colors, improve shearing, and fashion new luxury fur products. The seal skins used under the research and development contracts remain the property of the Government and most of them will eventually be sold at auction. The Bureau expects that proceeds from sales will offset the cost to the Government of the research and development work.

The Bureau of Commercial Fisheries manages and harvests the fur seals of the Pribilof Islands, 300 miles off the Alaskan coast in the Bering Sea, and cures the seal skins before shipping them to a processor.

Under an existing contract, seven-eighths of the fur seal harvests through 1967 will be delivered to the Fouke Fur Company, Greenville, S. C., for processing and sale. The remainder of the seal skins is reserved for experimental processing contracts with other interested firms.

Each year the United States harvests about 60,000 surplus young animals, of which about 45,000 processed pelts are sold for the United States account. Under the terms of the North Pacific Fur Seal Convention of 1957, Canada and Japan each receive 15 percent of the annual separate harvests of the United States and the Soviet Union. Alaska receives 70 percent of the net proceeds from the semi-annual fur seal auctions of United States seal skins.

Other seals of the same species breed at rookeries on islands off the coasts of Russia and Japan. Those rookeries are administered by the Soviet Union.

Note: See Commercial Fisheries Review, January 1965 p. 29.

Great Lakes

MICHIGAN PROPOSES CHANGE IN YELLOW PERCH COMMERCIAL FISHING REGULATIONS:

Public hearings were held in January 1966 by fisheries officials of Michigan's Conser-

vation Department to sound out its plans for improving Great Lakes yellow perch populations by liberalizing commercial fishing regulations.

Discussion at the hearing included proposals to remove closed seasons on yellow perch and lift size limits for processed and "in-the-round" perch.

Both of the planned changes were tentatively approved by the Conservation Commission in October 1965. The one dealing with closed seasons is expected to be modified so that an area near Tawas City will remain off limits to commercial perch fishing from June 10 through September 10.

Note: See Commercial Fisheries Review, December 1965 p. 32.

Gulf Fishery Investigations

Some of the highlights of studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during October-December 1965.

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: During the quarter, 41 plankton samples collected in June 1964 were examined for planktonic-stage penaeid shrimp. Planktonic stages occurred in most of the sampling area, but they were about five times more abundant in the waters over the Continental Shelf between Galveston and Port Mansfield than between Galveston and the Mississippi River. The overall abundance of young shrimp, however, was only slightly greater than that observed in May 1964.

Planktonic stages of commercially important shrimp, Penaeus spp., also occurred throughout the study area. They were, however, only twice as abundant in the waters west of Galveston as in the waters to the east. Greatest abundance was in the waters between the 15- and 25-fathom contours. Of the total catch of planktonic-stage Penaeus spp., 21 percent were postlarvae, 22 percent myses, 46 percent protozoeae, and 11 percent nauplii. Spawning, indicated by the occurrence of nauplii and protozoeae in plankton hauls, was not as intensive as in the preceding month.

During the quarter, measuring of all larval stages of Penaeus occurring in plankton hauls was begun in an attempt to differentiate species by length measurements. Adult shrimp, P. aztecus, P. duorarum, and P. setiferus, although possessing similar life histories, generally occupy different bathymetric ranges. Consequently, length measurements of the earliest larval stages (naupliar and protozoeal) may vary bathymetrically, thus providing a gross method for larval species differentiation.

Three attempts were made during the quarter to culture pink and brown shrimp larvae in 150-gallon tanks. Although numerous nauplii were obtained, it was not possible to rear the larvae through the protozoeal stage. The major problem has been to supply adequate numbers of diatoms as food for the larvae. During the summer and early fall of 1965, the diatom Skeletonema sp. was grown in 40-liter cultures by adding the metal chelator EDTA to filtered sea water. Starting in October, it was no longer possible to culture Skeletonema in that manner. It was since learned that additions of commercial fertilizers, iron, and EDTA to sea water will support growth of Skeletonema during the fall months.

Tabulation of data on fish caught in experimental trawling operations along the Texas coast during 1962-64 was completed during the quarter. Data were being constructed for a report dealing with the seasonal distribution and abundance of 30 species of fish occurring over the Continental Shelf along the Texas and Louisiana coasts.

Catches of longspine porgy (Stenotomus caprinus) along the Texas coast were usually greatest on the commercial fishery grounds of the brown shrimp. Those catches were usually in excess of 100 pounds an hour trawled and were made at 15-, 25-, and 35-fathom stations. No species dominated the fish catches made on the white shrimp grounds (shallower than 10 fathoms) off Texas.

Cultivation of Shrimp in Artificial Ponds: One problem encountered during the first experiments to rear shrimp in seminatural ponds was that of obtaining and stocking large numbers of postlarvae collected in the Galveston Pass without also stocking many shrimp predators. To eliminate those problems, attempts were made to obtain a spawn by placing gravid pink and brown shrimp females in the static-water pond and rearing the resulting young through the larval stages. In each of three attempts, recaptured females had spent ovaries the day following their release. Subsequent sampling for eggs and nauplii, however, was unsuccessful.

In another experiment, several thousand pink shrimp nauplii, which had hatched under laboratory conditions, were also put in the static-water pond. They, too, failed to survive. Failure in the initial trials can, in part, probably be attributed to the entanglement of eggs and nauplii in phytoplankton and bottom detritus. Similar results have been observed in laboratory experiments, but they have been eliminated by constant aeration.

During the initial growth studies conducted between March and October 1965, a high mortality of shrimp was noted in the static-water pond following applications of fertilizer. Tests were conducted to determine the toxicity of fertilizers to shrimp and the optimum level of fertilizer necessary for lush plankton growth. The results of the tests will be used as guides for applying fertilizers during the 1966 growth studies.

Movements, Growth, and Mortailty of Commercial Shrimps: A mark-recapture experiment was begun on the Florida Tortugas grounds during October to collect additional growth and mortality data on pink shrimp. Three groups of shrimp, representing restricted size ranges (small, medium, and large), were stained with distinctive dyes and released near the center of the fishery. Of the 7,199 shrimp released, 1,024 (14 percent) were recovered. In spite of careful planning prior to the experiment, it is doubtful that the results will be suitable for determinations of mortality rates. It is suspected that significant numbers of stained

shrimp were not detected because unusually good catches forced processors to ship landings to distant plants before they were examined for marked shrimp.

The white shrimp marking experiments conducted in Galveston Bay, Tex., during July and August were completed by the end of 1965. About 10 percent (959 shrimp) of the stained shrimp were returned. Preliminary analysis of the recovery data indicates a dispersion of the marked groups throughout Galveston and Trinity Bays. During the latter stages of the experiment, a seaward movement took place and 12 stained shrimp were recovered from the Gulf.

Commercial Catch Sampling: Studies designed to evaluate the reliability of shrimp landings statistics continued during the quarter. An indication of the variation present in estimates of the size composition of shrimp landings and in the catch per unit of effort by commercial trawlers was obtained by comparing data collected at Freeport and Aransas Pass, Tex., for July through November. Only minor differences were evident in the estimates when fleets from the two ports fished in the same area, indicating that the sampling procedures are reliable.

Laboratory personnel spent considerable time during the quarter taking various shrimp measurements which will be used to establish accurate means for converting length to weight and tail length to total length. These relations are being developed for each sex of the three commercial species of shrimp.

Three additional sampling agents of the Bureau temporarily stationed at Key West and Marathon, Fla., obtained interviews from 85 percent of 937 landings there during October and November. Approximately 600 interviews were obtained by samplers at Freeport and Aransas Pass, Tex., during the same period.

Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Routine sampling for postlarval shrimp continued during the quarter at four locations along the Texas coast. With the advent of winter, however, reduced numbers of postlarvae were collected at all stations. Additional tows were made in September to determine whether or not postlarvae tend to skirt the main current when moving through the tidal pass. Collections were taken with a small beam trawl in progressively deeper water beginning at the shoreline of the pass. Results obtained agreed with those from sampling of this type conducted in spring 1964 when it was learned that decreasing numbers of postlarvae occurred with increasing depth from the shoreline toward the channel.

Trawling for juvenile brown and white shrimp for growth data continued on a weekly basis. The Swan Lake sampling site was abandoned in late October following a major fish kill in the area, but weekly trawl hauls continued at a new site in Moses Lake. Juveniles of both species became scarce in late December.

Weekly sampling of the bait shrimp fisheries of Galveston, Aransas Pass, and Pt. Isabel for species composition information continued during the quarter. The 1965 crop of juvenile brown shrimp remained in Galveston Bay longer and accounted for a higher percent of the commercial bait catch than in 1964. Also, bait shrimp production was 47 percent higher for October and November in 1965 than in 1964.

EXPERIMENTAL BIOLOGY PROGRAM: Behavior and Ecological Parasitology: A previous report described burrowing of brown shrimp postlarvae in response to experimentally reduced temperature. This type of behavior, previously unknown for postlarval shrimp, occurred at 12° to 16½° C. (53.6° to 61.7° F.) in the laboratory. According to field observations from workers in the Bureau's Shrimp Biology and Shrimp Dynamics Programs, in nature the numbers of postlarvae collected in the water column per unit effort are quite small when water temperatures are in that range.

Subsequent laboratory results reveal the crustaceans leave their burrows as the temperature increases. This response was observed most frequently in the temperature range of 18° to 21½° C. (64.4° to 68.9° F.). Field workers in the northwestern Gulf of Mexico have noted that the major influx of brown shrimp postlarvae occurs in the early spring when water temperatures have reached that range.

Information is needed to determine how postlarvae move from offshore spawning areas to bay nursery areas. As part of an effort to investigate the problem, six experiments were made intended to estimate the ability of postlarval brown shrimp to swim continuously. For the 56 specimens studied as of that time, individual swimming stamina ranged from 0.0 to 10.5 days of uninterrupted swimming. The mean value was 2.8 days.

Considerable variation in performance between groups of postlarvae seems to be related to their tendency to jump out of experimental containers. Groups in which jumping out was common had the highest mean values for swimming stamina. It is possible that this relation could provide a basis for a method by which the condition of live shrimp could be evaluated.

Identification and enumeration of parasites from samples of shrimp from several Texas bays was continued during the quarter. The latest results showed that the trematode, Opecoeloides fimbriatus, is a common parasite in some bays and uncommon in others. Hence, this worm may be useful in tracing shrimp to their nursery areas.

Growth and Survival Studies: An experiment was conducted during the quarter to determine the suitability of fish protein concentrate (fish flour) as food for juvenile and subadult shrimp. Twenty juvenile white shrimp were isolated in 10-gallon aquaria, one per container. During the 27-day experimental period, one group of 10 shrimp was fed the flour and the second group was fed frozen adult brine shrimp. No deaths occurred in either group. As in an experiment previously conducted with brown shrimp, growth of animals fed frozen brine shrimp surpassed those fed the flour. There was a 54-percent weight increase in the group receiving brine shrimp compared with a 29-percent weight increase in the fish flour group.

Experiments were also conducted with postlarvae reared in the laboratory by the staff of the laboratory's Shrimp Biology Program. In one experiment, the effect of temperature on postlarval seabobs was tested using growth as an indicator. Four temperatures were tried--11°, 18°, 25°, and 33° C. (from 51.8° to 91.4° F.). Two hundred animals were involved--50 at each temperature level. Salinity in each instance was 29 p.p.t., the salinity to which the shrimp were accustomed. Growth was best at the two higher temperatures, as

evidenced by increases in weight of 273-fold at 33° C. (91.4° F.) and 167-fold at 25° C. (77° F.). At 18° C. (64.4° F.), there was only a 13-fold weight increase. There were no survivors after the 4th day at 11° C. Though the growth of survivors was greatest at 33° C., survival was poor. Only 23 percent of the test animals survived at that temperature as compared with 56 percent at 25° C. Survival was also low (23 percent) at 18° C.

In a second experiment, laboratory-reared, post-larval pink shrimp were exposed to various levels of temperature and salinity to provide short-term survival data for comparison with that previously obtained with brown shrimp. At the low salinities, 10 p.p.t. or less, the pink shrimp did not survive as well for 24 hours as the browns at any temperature tried--7°, 15°, 25°, 33° C., or 36° C. (from 44.6° to 96.8° F.). At 25 p.p.t. survival was good with 85 percent surviving at 36° C. and 100 percent at the other temperatures (7°, 25°, and 33° C.).
Note: See Commercial Fisheries Review, December 1965 p. 34.

Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES: Production and Imports, January-November 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 11 months in 1965 amounted to 480,274 short tons--138,564 tons (or 22.4 percent) less than during the same period in 1964. Domestic production was 3,095 tons (or 1.4 percent) higher, but imports were 141,659 tons (or 35.3 percent) lower than in January-November 1964. Peru continued to lead other countries with shipments of 206,006 tons.

U. S. Supply of Fish Meal and Solubles, January-November 1965

Item	Jan.-Nov. 1965	Jan.-Nov. 1964	Total 1964
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	165,675	155,302	160,349
Tuna and mackerel	24,654	19,239	21,113
Herring	12,050	8,781	8,881
Other	18,204	34,166	44,909
Total production	220,583	217,488	235,252
Imports:			
Canada	40,046	50,247	54,769
Peru	206,006	319,144	348,025
Chile	5,201	11,407	12,942
Norway	78	-	-
So. Africa Rep.	3,600	15,834	18,581
Other countries	4,760	4,718	4,826
Total imports	259,691	401,350	430,143
Available fish meal supply	480,274	618,838	674,395
Fish Solubles:			
Domestic production	91,019	90,557	93,296
Imports:			
Canada	1,373	1,390	1,553
So. Africa Rep.	-	935	987
Other countries	3,650	1,903	1,965
Total imports	5,023	4,228	4,505
Available fish solubles supply	96,042	94,785	97,801

The United States supply of fish solubles during January-November 1965 amounted to 96,042 tons--an increase of 1.3 percent as compared with the same period in 1964. Domestic production and imports of fish solubles increased 0.5 percent and 18.8 percent, respectively.

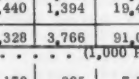
* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES: Production, November 1965: During November 1965, a total of 10,995 tons of fish meal and about 8.2 million pounds of marine-animal oil was produced in the United States. Compared with November 1964, this was an increase of 263 tons of fish meal but a decrease of 66,000 pounds of marine-animal oil. Fish solubles production amounted to 4,328 tons--an increase of 562 tons as compared with November 1964.

U. S. Production of Fish Meal, Oil, and Solubles, November 1965 1/ with Comparisons

Product	Nov. 1965	Nov. 1964	Jan.-Nov. 1965	Jan.-Nov. 1964	Total 1964
			(Short Tons)		
Fish Meal and Scrap:					
Herring	249	405	12,050	8,781	8,881
Menhaden 2/	8,072	7,154	165,675	155,302	160,349
Tuna and mackerel	1,997	2,026	24,654	19,239	21,113
Unclassified	677	1,147	18,204	34,166	34,809
Total 3/	10,995	10,732	220,583	217,488	225,152
Fish Solubles:					
Menhaden	2,888	2,372	71,575	67,045	68,738
Other	1,440	1,394	19,444	23,512	24,558
Total	4,328	3,766	91,019	90,557	93,296
			(1,000 Pounds)		
Oil, body:					
Herring	178	365	7,526	10,261	10,354
Menhaden 2/	6,683	7,339	169,680	152,437	157,730
Tuna and mackerel	766	447	5,094	4,598	4,816
Other (inc. whale)	610	152	5,273	7,160	7,298
Total	8,237	8,303	187,573	174,456	180,198

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.



New England

FORECAST OF GROUNDFISH AND SEA SCALLOP ABUNDANCE IN 1966 ON NEW ENGLAND FISHING BANKS: The abundance of the various species of groundfish and sea scallops fished by New

England fishermen will show no drastic changes during 1966, according to the Director of the North Atlantic Region of the U. S. Bureau of Commercial Fisheries. The forecast is based on information provided by biologists of the Bureau's Woods Hole Biological Laboratory who monitor the landings of commercial fishermen and study, by sampling, the populations of fish and shellfish on offshore fishing banks with the Bureau's fishery research vessel Albatross IV.

Haddock landings in New England in 1965 totaled about 115 million pounds--down 2 million pounds from 1964. The decrease in landings in 1965 was due to markedly lowered catches from Browns Bank and the Gulf of Maine; landings from Georges Bank increased by 9 million pounds.

The very abundant 1963 year-class of haddock found by the Albatross IV in its annual fall survey in 1963 started entering the Georges Bank fishery as small scrod in 1965 and will remain a dominant year-class during 1966. As a result, 1966 will be an excellent scrod year on Georges Bank. Surveys by the Albatross IV indicate that the two following year-classes (1964 and 1965) are small ones so the Georges Bank fishery will depend primarily on the single 1963 year-class for two more years.

On Browns Bank the 1963 year-class will not appear in the landings until 1967 because of the slower growth rate on that bank. The appearance there will come at a time when abundance may be somewhat reduced on Georges Bank.

Landings of cod in 1965 were about 30 million pounds, down from the 32 million pounds landed in 1964. This was due to decreased fishing since the abundance index for cod in the areas fished was the same in 1965 as in 1964. In 1966 the abundance is expected to hold steady.

Yellowtail flounder have been unusually abundant in recent years. Landings reached a peak of 79 million pounds in 1964. In 1965 the landings dropped to 76.5 million pounds. The incoming year-classes appear to be smaller than in recent years so that abundance is expected to drop somewhat further in 1966.

United States landings of whiting (silver hake) dropped sharply from the 87 million pounds landed in 1964 to 76 million pounds in 1965. Both U. S. and Soviet fishermen fished for that species. The Soviets fished Georges Bank while U. S. fishermen fished primarily other areas such as along the Maine Coast, in Cape Cod Bay, and off Nauset. Abundance in those latter areas in 1965 was lower than in 1964 and there is no reason to believe the situation will improve significantly in 1966.

Ocean perch (redfish) landings in the United States in 1965 totaled about 80 million pounds--down from the 89 million pounds landed in 1964, and the lowest since 1939. The drop was due to a poor market for that species as abundance increased in all areas normally fished by U. S. fishermen, from the Gulf of Maine to the Grand Bank of Newfoundland. Abundance of that species in 1966 is expected to continue to increase over the 1965 level.

United States landings of sea scallop meats in 1965 totaled about 19.5 million pounds as compared with 15.5 million pounds in 1964. Abundance of sea scallops on Georges Bank, the principal fishing grounds, has declined in recent years, but total landings were maintained in 1965 by diversion of some effort to the Middle Atlantic grounds. Abundance on Georges Bank during 1966 is expected to hold at the 1965 level or slightly below.

North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, JANUARY 1966:

There was a substantial increase in Soviet fishing activity in the Northwest Atlantic dur-

Fig. 1 - Soviet tug Sterequshchii making repairs to Soviet trawler Perekop in Cape Cod Bay.

ing January 1966. A sizable fleet of large conventional side trawlers returned to Georges Bank from U.S.S.R. ports and from other fishing areas. Several processing vessels of recent construction were also observed.

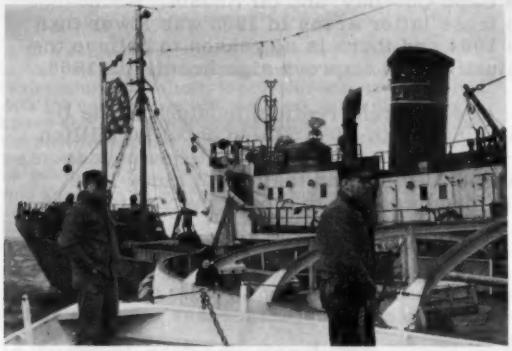


Fig. 2 - Departing Soviet trawler Perekop after completion of inspection by U. S. Government employees.

In all, a total of 49 vessels were sighted and identified as 24 fish-factory stern trawlers, 5 processing and refrigerated freezer stern trawlers, 16 large refrigerated side trawlers, 2 fish transports, and 2 fuel and water carriers.

The Soviet vessel observations were made by the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts reconnaissance flights cooperatively with the U. S. Coast Guard.

Despite severe weather conditions which prevailed during most of the month, the majority of the vessels were actively fishing. The vessels were divided into small groups and were widely dispersed from south of Montauk Point, Long Island, eastward along the 100-fathom curve of the Continental Shelf to the southeast part of Georges Bank.

The factory stern trawlers were operating primarily in areas ranging from 60 miles south of Block Island to 30-40 miles south and southeast of the Nantucket Lightship. Heavy to moderate catches of fish on deck and in the trawls appeared to be primarily red hake and whiting, with undetermined quantities of haddock. The Soviets had much success in fishing for red hake in those general areas commencing about this time in 1965.

Large refrigerated side trawlers, several support vessels, and one large factory base ship were operating on the southeast part of Georges Bank 100 miles southeast of Cape Cod. The heavy catches of fish appeared to be mostly haddock, with lesser amounts of whiting. Crews on deck were dressing fish which are bagged in sections of netting and transferred to a nearby processing ship.

The southeast part of Georges Bank has been an extremely productive area for scrod haddock and was fished almost entirely by the U. S. fleet during 1965.

At the end of January there were only a limited number of Soviet vessels operating off the eastern Nova Scotia areas.

Fig. 3 - U.S. Government fishery resource management official inspecting section of netting on board Soviet trawler Perekop during boarding in Cape Cod Bay.

The Soviet salvage tug Steregushchii towed the Perekop (a 229-foot, 658-gross ton, steam-driven, conventional side trawler) into shelter of Cape Cod Bay in order to make emergency repairs. The vessels were boarded by U. S. Government employees.

North Atlantic Fisheries Explorations and Gear Development

SURF CLAM SURVEY CONTINUED:
M/V "Delaware" Cruise 65-10 (September 10-November 24, 1965): Continuation of an Atlantic surf clam survey conducted during the summer of 1963 and 1964 was the purpose of this cruise by the U. S. Bureau of Commercial Fisheries Exploratory fishing vessel

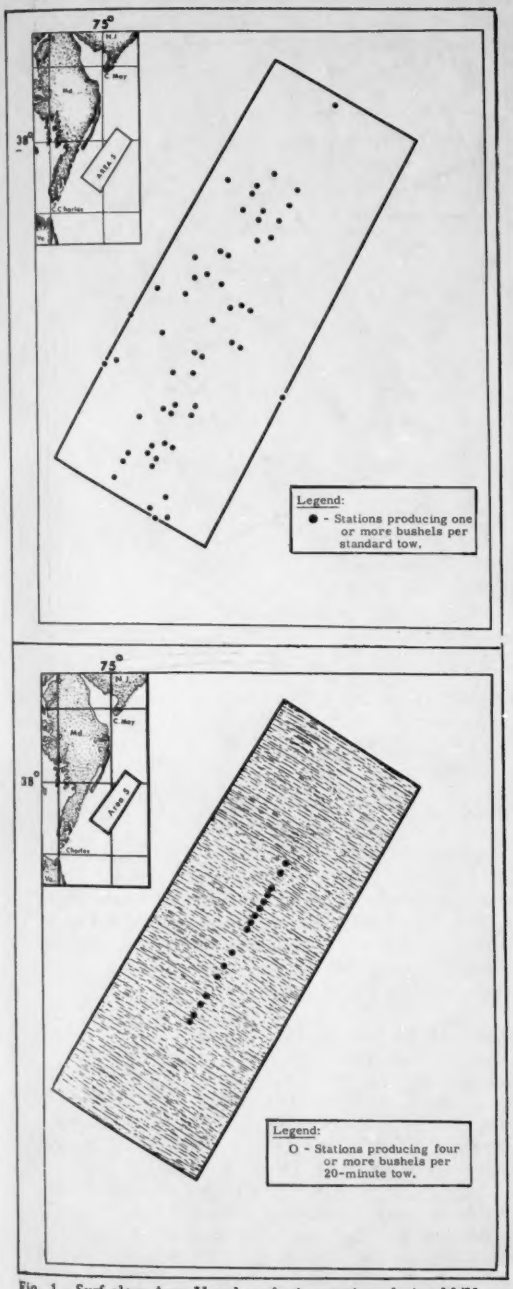


Fig. 1 - Surf clam Area V and producing stations during M/V Delaware Cruise 65-10 (September 10-November 24, 1965).

Delaware off the coasts of Maryland and Virginia. The survey was initiated in cooperation with the Sea Clam Packers Committee of the Oyster Institute of North America.

The remaining unexplored section of Area V and most of the unexplored sections of Area VI were completed. Of the 716 stations occupied, 194 tows were made where the catches of surf clams from the standard 4-mile tow equaled up to 3.6 bushels. The 53 commercial-length tows yielded up to 16.3 bushels in 20-minutes.

SURVEY PROCEDURES: The same procedure was used as that of past clam surveys. At each intersection of one-mile spaced grid lines, samples were taken by dredging the bottom with a 48-inch hydraulic dredge. Dredging was continued for 4 or 2 minutes depending upon the type of bottom soil in the towing area. To obtain commercial-size samples, tows of 20 minutes were made continuously along a selected grid line in Area V. This was done by returning the dredge to the bottom after each tow and fishing it without intervals of nondredging between stations.

All stations surveyed in Area VI, except for several made along the central part of the first four inshore grid lines, were in the southeast quadrant of the area. The section just north of this quadrant was bypassed because of danger from unexploded mines in the area.

Isolated stations in area V that were bypassed in previous surveys, in addition to grid lines 13, 14, 15, 16, 17 and 18, were completed by the end of the cruise. That completes the planned survey work in Area V.

SURF CLAM CATCHES: Of the 663 standard tows conducted during the cruise in both areas, the catch from 18 equaled or exceeded one-quarter bushel per minute of towing time and included a maximum catch rate of 0.9 bushels per minute. Of the 645 remaining tows, 250 of them yielded from 1 clam to 1 bushel. The remaining 395 tows yielded no clams. In the commercial group (53 tows), 16 tows yielded catches of 4 or more bushels per 20 minutes of towing time. One sample of the 53 contained no clams, leaving 36 tows where the catch varied from a few clams to 4 bushels. A higher percentage of zero catches was made during this cruise than previous cruises in the two areas; about half of the sur-

vey work was carried out near positions where poor results were obtained previously.

The best concentrations of surf clams were found in the southeast quadrant of Area VI. Larger catches were made at the northeast part of that quadrant and few clams were taken elsewhere in Area VI. No new beds were found in Area V where the population of surf clams was large enough to be significant for commercial utilization. Only 2 stations, one each on grid lines 1 and 18, of Area V yielded catches equal to one-quarter bushel per minute of towing time. Stations surveyed along the inshore grid lines of both areas yielded poor catches (similar to those taken previously in the same general location). Results from the offshore grid lines were about the same as those of the previous cruises--where depth of water exceeded 20 fathoms, few or no surf clams were found. In the commercial towing section of Area V, the best catches were made along the section of grid line 10 lying between Loran bearing 1H4-2629 and 1H4-2862. It was there, along grid line 10, that good catches of surf clams were taken during cruise 65-2 in standard 4-minute survey tows. Those results validate the 4-minute tow as a resource-assessment method.

Throughout all sections surveyed, the size and occurrence of the catches varied with the type of bottom. Best results were obtained where the bottom was coarse sand, gravel, or a combination of both. Tows made on soft or rocky bottom did not yield as good results as other bottom types. It was noted that poor catches were made in what was considered good bottom soils.

Water depth is a factor to consider in the analysis of the catch. The best catches were made in depths of 16 to 20 fathoms in agreement with previous findings. A small number of good catches was made in shallower water. The commercial-length tows showed the same relationship. The shallow waters below 16 fathoms and deep waters below 20 fathoms yielded poor results.

SIZE OF SURF CLAMS: All sizes of surf clams, except those which are too small for the dredge to retain, were taken during the cruise. As found for all previously surveyed sections, the predominant size group was 5 to 7 inches and larger. In the southeast quadrant of Area VI, the proportion of clams in

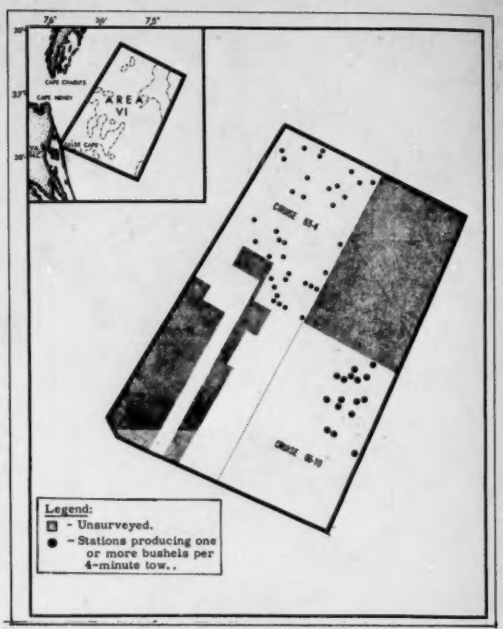


Fig. 2 - Surf clam Area VI and producing stations during M/V Delaware Cruises 65-4 and 65-10 (September 10-November 24, 1965).

the 6- to 7-inch group was greater than obtained previously in all areas surveyed. Because of the predominance of this size group, the average catch of medium and small surf clams was smaller from this quadrant than from other sections of the area.

This group-size relationship was noted in the commercial-scale catches of Area V. The predominant size of clams were five inches or over. In nearly all tows, however, a few medium clams were found mixed with the larger clams; in one tow they made up the bulk of the catch.

Surf clams shells and other shellfish species common to the area were taken at most of the survey sites. The abundance of shells varied considerably throughout each section surveyed. In the southeast quadrant of Area VI, the quantity of shells taken in many tows was larger than from other sections. Shells in great numbers were present in most of the productive tows. Few tows consisted mainly of pure live surf clams. Considerable numbers of shells were present in all but a few tows made in the commercial-sampling area.

BLACK QUAHOGS: Black quahogs were found at many scattered sites throughout Area VI, but not in large quantities equal to those found in other areas. Good catches were made along the offshore grid lines where the depth of water exceeded 24 fathoms in Area V. This depth relationship is about the same as was found during other cruises. During the commercial-length tows, few black quahogs were taken in any of the tows, this probably was due mainly to the depth factor.

Note: See Commercial Fisheries Review, September 1965 p. 34, for report on Cruise 65-4.

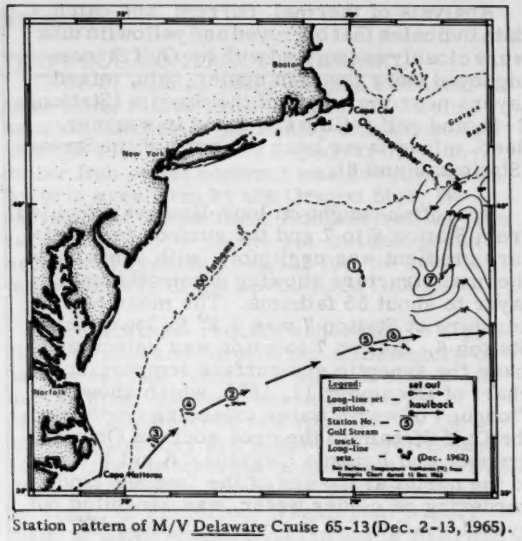
* * * * *

TUNA AND SWORDFISH EXPLORATIONS IN NORTHWEST ATLANTIC CONTINUED:

M/V "Delaware" Cruise 65-13 (December 2-13, 1965): Explorations for tuna and swordfish south of Georges Bank and east of Cape Hatteras were continued during this 12-day cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. Primary objectives were to: (1) continue surveying the distribution and abundance of tuna in the Northwestern Atlantic, (2) investigate availability of swordfish beyond present commercial fishery areas, and (3) examine the relationship of thermal environment to availability of tuna and swordfish. Exploration in December 1965 included 16 long-line sets southeast of Georges Bank with good catches of swordfish and bluefin tuna, and small catches of big-eyed and albacore tuna. This information clarifies and enlarges the seasonal distribution picture for swordfish, yellowfin, big-eyed, and albacore tuna. Fishing results and thermal environment data obtained gave good indications of swordfish concentrations off Oceanographer and Lydonia Canyons.

LONG-LINE SETS AND CATCH: Three sets of long-line gear were fished during daylight hours and 4 sets were made from night into day periods. Units of mainline were 220-fathoms long with hooks spaced every 20 fathoms on 5-fathom branchlines. Each 10-hook unit was buoyed from the surface with a 5-, 10- or 20-fathom line. Squid and herring bait was used alternately on every other unit.

Fifteen small yellowfin tuna (Thunnus albacares) were caught at 2 stations (5 and 6) having the highest surface temperatures--size range 20 to 32 pounds (round). Five yellowfin were shark damaged. Catch rates were low (1.0 and 1.5 fish per 100 hooks) and did not indicate concentrations. Small school



Station pattern of M/V Delaware Cruise 65-13 (Dec. 2-13, 1965).

tuna (thought to be yellowfin) were observed surfacing alongside and in the vessel's wake during a 20-minute haulback period at Station 6. With the exception of 1 big-eyed tuna (Thunnus obesus) weighing 19¼ pounds (round), the weight range was 60 to 186 pounds and the average was 125 pounds. One albacore (Thunnus alalunga) weighing 28 pounds was caught at Station 7.

Nine of the 11 swordfish (Xiphias gladius) caught on long-line gear were at Stations 6 and 7. Average size of the fish was 83 pounds ranging from 24 to 135 pounds. Two larval swordfish were taken in a surface plankton net at Station 5. Other noteworthy long-line catches included 2 blue marlin (Makaira nigricans), 1 opah (Lampris regius), and 4 gempylids (Lepidocybium flavo-brunneum).

ENVIRONMENTAL RELATIONSHIPS: Thermal data used during the cruise were: (1) synoptic sea surface temperature isotherm and layer-depth isopleth data received from the U. S. Naval Oceanographic Office by radiofacsimile equipment aboard the vessel, (2) continuous sea surface temperature recordings, and (3) vertical (subsurface) temperature profile data obtained with bathythermograph (BT) equipment. Current observations were made from speed and direction of gear drift during fishing periods.

Analysis of thermal, current, and catch data indicates that big-eyed and yellowfin tuna were closely associated with the Gulf Stream--big-eyed were found in cooler, thin, mixed layers near the edges of the Stream (Stations 2-4), and yellowfin were found in warmer, deep, mixed layer near the core of the Stream (Stations 5 and 6).

Swordfish caught on long-line gear doubled from Station 6 to 7 and the surface temperature gradient was negligible, with subsurface thermal structure showing a homothermal layer to about 55 fathoms. The mean temperature at Station 7 was 8.3° F. lower than Station 6. Station 7 location was selected from the synoptic sea surface temperature chart of December 11, 1965, which showed a "tongue" of warm water extending north from the Gulf Stream to the area south of Oceanographer and Lydonia Canyons. A set further to the north, at the end of the "tongue" and bordering on colder water, was cancelled out by bad weather. A bathythermograph (BT) transect of the northwestern edge of the "tongue" indicated a complex subsurface temperature structure with underlying layers of warmer water. Similar structures in that area were noted in December 1962 when Woods Hole Oceanographic Institution's exploratory long-line catch rates averaged 7.9 swordfish per 100 hooks over nine sets. North of the area (500 fathoms in Oceanographer Canyon) the vessel ran through surface schools of saury (Scomberesox saurus) for two hours with the same bait noted in the stomach contents of swordfish taken at Station 7. No fishing vessels were seen in that area.

FISHING DEPTH OF LONG-LING GEAR: Depth of the center of the mainline curve (catenary) between buoylines (220 fathoms apart) was examined using 500-foot bathykymograph recorders with 12-hour clocks. Records made by those instruments revealed greater fishing depth of the gear than expected. Long-line sets, in general, fished deeper near the ends of the gear. During most sets the gear did not fish at a constant depth but slowly descended until hauled. The effect of current upon gear depth caused radical variations. Preliminary review of the recordings suggests that buoyline length has less effect on long-line fishing depth than distance between buoys and current velocity.

OTHER ACCOMPLISHMENTS AND OBSERVATIONS: In cooperation with the Woods Hole Oceanographic Institution and the Shark Research Panel of the American Institute of Biological Sciences, 2 big-eyed tuna, 1 blue marlin, and 68 sharks were tagged and released. Physiological (body temperature regulation) data were collected on big-eyed and yellowfin tuna, swordfish, blue marlin, mako and silky sharks by personnel from the Woods Hole Oceanographic Institution. Ten experimental semiautomatic branchline clips were successfully tested for manual application in the fishing operation.

Note: See Commercial Fisheries Review, Nov. 1965 p. 27.

Oregon

WILLAMETTE RIVER SILVER SALMON COUNT RESUMED IN 1965:

Counts of adult silver salmon passing over Willamette Falls during the 1965 season were 47 percent greater than the previous high recorded in 1957, according to the Oregon Fish Commission. The run size calculation is based on actual counts of fish passing through the old Willamette Falls ladder during sample periods. This figure is then expanded to cover a full 24-hour day. On this basis, the 1965 run was calculated to total 10,300 silver or coho salmon, consisting of 7,800 3-year-olds and 2,500 2-year-olds or jacks.

Counting of the Willamette River silver salmon run was first started during the 1954 season and it continued through 1960. The counting was done each of those years during identical daily, 8-hour, daylight periods when the silver salmon were in the river. Lack of funds for the program precluded counting activities during the 1961-64 period. In 1965, with Columbia River Fishery Development Program funds provided through the U. S. Bureau of Commercial Fisheries, an extensive, one-year silver salmon counting project was set up at the falls. It is hoped a continuing program can be financed which will provide a basis for evaluating the efficiency of the proposed $2.2 million Willamette Falls fishway in passing the runs of silver salmon into Willamette system.

Because of extremely low flows during the upriver migration period during the fall of 1965, temporary repairs to the existing ladder were required to enable silver salmon to use the facility. Counting began on September 2 and continued through December 20, with the

peak movement observed during October 22-27.

The total 1965 run figure is not readily comparable with figures obtained in earlier years since the season's activities were much more intensive. The best comparison under these circumstances is obtained by considering counts made in 1965 during exactly the same 8-hour, daylight periods that counting was conducted in the 1954-1960 years. On this basis the 8-hour count shows 4,360 3-year-old silver salmon for the 1965 season compared with the previous high of 2,950 adults in 1957. The 7-year average for the 1954-60 period was 1,311 adult fish.

The counts of early maturing male fish that return at two years of age have been higher in former years but this group of fish has little effect on the production of silver salmon from the river above the barrier. However, the size of 2-year-old returns is often an indication of the magnitude of the run of 3-year-old adults expected in the following year.

The greater numbers of silver salmon in the Willamette run appear to reflect increased Oregon Fish Commission efforts in introducing both fingerling and fry silver salmon into various Willamette tributaries. In the last two years adult fish, surplus to Fish Commission hatcheries, have been transplanted in order to help realize the potential for that species in the Willamette system. Success of these introductions gives grounds for considerable optimism over the possibility for developing a large run of silver salmon in the Willamette River when the much-discussed Willamette Falls fish ladder becomes a reality. Construction of the huge ladder will get underway early this spring when the troublesome cul-de-sac portion at the west end of the falls is started. Fishery biologists believe that eventual completion of the project could raise the potential anadromous fish escapements above the falls of the Willamette River to as high as 285,000 salmon and steelhead, some 90,000 of which would consist of silver salmon. Such dramatic increases in production would bode well for the future success of sportsmen and commercial fishermen alike.

Salmon

FISH FOOD CONTRACT AWARDED

Over 37 million young salmon and steelhead being raised in 15 Oregon Fish Commission hatcheries will enjoy a balanced diet through 1966. Recently a quarter-million-dollar fish pellet contract was awarded to an Astoria area firm by the Oregon State Department of Finance and Administration. The successful bidder on the 1.8-million-pound order will receive $252,252 for the completed shipments of the specialized fish food.

Specifications require adherence to a precise formula and involve the manufacture of pellets varying from $\frac{1}{32}$ of an inch to $\frac{1}{8}$ of an inch in size. Seventy-seven deliveries of 24,000 pounds apiece are specified by the contract and they are scheduled over the season to 8 key hatcheries in the State. The U.S. Fish and Wildlife Service, Washington Department of Fisheries, Washington Department of Game, Idaho Department of Fish and Game, and the Oregon Game Commission have also placed substantial orders with the same firm in past years. Over 7 million pounds of the specialized fish food will be used this year in the 3 Northwest States.

The pellet was developed jointly by Oregon State University and Oregon Fish Commission scientists and has since become the predominant diet fed to hatchery-produced salmon in the Northwest. Increasing numbers of steelhead trout are also being switched to the pellet. The ration is a pelletized fish food which was developed to best utilize both the nutrition and cost benefits available in fresh fishery waste products. These are combined with dry ingredients to produce a food that has from 30 to 35 percent moisture content. The pellet presently being fed shows excellent nutritional advantages as well as being readily acceptable to the young fish. An additional advantage lies in being able to combine drugs or antibiotics into the pellet during manufacture, thus allowing treatment of disease as a part of the regular diet when needed.

Along with improved hatchery techniques in general, the pellet has had a profound influence on the ability of hatcheries to produce dramatic returns of silver or coho salmon and thereby greatly supplement the runs of this species which are harvested by sportsmen and commercial fishermen alike.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, OCTOBER-DECEMBER 1965:

A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for October-December 1965, follows:

Oyster Studies: A State-Federal deep-water oyster project surveyed 27 lineal miles of creeks and rivers locating existing and potential oyster beds. A small planting of seed oysters from the Wando River was moved to deep water in the Toogoodoo River where somewhat comparable hydrographic conditions existed. Inspection of those oysters three months later showed that survival was good and new growth fair among these transplanted seed. A second and larger transplant was made to two other areas during the last quarter of 1965.

Oyster studies programmed under special funds from the South Carolina Wildlife Commission made progress, particularly in the inventory work. Almost complete data has been gathered on the general physical environment, the quantity and quality of oysters in the Leadenwah River system. Tentative information indicates that this river system is producing about 10,000 to 15,000 bushels of oysters annually from 1,396 acres of marsh lands and 408 acres of oyster bottoms and tidal flats. With these basic data and by repeating the sampling of the oysters themselves throughout the year and throughout the years, the overall pattern of oyster conditions will become known. Considerable work of a similar nature has been carried on in the Ashepoo River system. Information extending back to 1936 for some areas in South Carolina was being sorted and assembled so that surveys of the same areas can be made now for comparison with the earlier surveys.

Pesticides: Sampling at the previously established monitoring stations continued on a monthly basis during the quarter. Fish and oyster samples from the Ashley River continued to produce DDT residuals in concentrations above the levels of samples from other areas. During November 1965, the DDT residuals of both fish and oyster samples from this area were the highest recorded so far--0.051 and 0.028 p.p.m., respectively. Dieldrin at 0.014 was recorded for the first time at the same station. As a whole, at all stations, the residual levels of DDT and Dieldrin have been on a general increase since August 1965.

Bears Bluff Laboratories is extending its cooperative investigation on pesticides with the U. S. Bureau of Commercial Fisheries Laboratory at Gulf Breeze, Fla. Each month, fresh and quick frozen fish are shipped to Florida for analysis on the amount of Acetylcholinesterase (AChe) to determine the amount of organo-phosphate pollution.

Crab Studies: Studies on the blue crab, authorized with special funds from the South Carolina Wildlife Resources Commission, have been somewhat slow in getting underway as far as field work is concerned. The compiling and assembling of the catch per unit of effort by experimental trawls at some 20 stations from 1953 through 1965 has been completed. The purchase and assembly of the necessary gear and equipment for field work is well underway, and field work was scheduled to begin shortly after the first of the year. One set of studies to be emphasized will be to compare the catch per unit of effort by crab pots and by trawls in the vicinity of Murrells Inlet, S. C., where no commercial crabbing and no commercial trawling for shrimp or crabs takes place. Similar data will be gathered from the area in the vicinity of Price Inlet, which annually supplies one-tenth of the crab crop of the State, and where shrimp trawling is carried on offshore from June through mid-December. Data from those areas will be compared with similar information gathered in the same manner from the vicinity of Hunting Island in Beaufort County, an area which is intensely trawled for crabs and shrimp, and where commercial crabbing is carried on throughout the year. It is hoped that after at least a year's study of the kind outlined, some indication will be obtained of the effect of trawling for crabs and shrimp, and the commercial harvesting of crabs, on the crab population.

Shrimp Studies: White shrimp were about three times more abundant in experimental trawling operations during October-December 1965 as in the same quarter of the two previous years (table). Earlier in 1965, largely on the basis of data from experimental trawling and plankton tows, Bears Bluff predicted that the crop of white shrimp for 1965 would be markedly improved. Commercial landings through December show that the catch for the year was over 7 million pounds.

Cooler weather in December forced small shrimp out of the shallow waters and into the deeper areas of the river mouths and sounds. If water temperatures during the early months of 1966 do not drop too low, those shrimp should winter-over and produce a good population of roe shrimp in the spring of 1966.

The majority of the brown shrimp left inside waters comparatively early in 1965, possibly as a result of heavy competition with the very abundant white shrimp. During October through December, brown shrimp were almost nonexistent in experimental trawling operations. A few postlarval brown shrimp began to appear in plankton samples in late November and December, indicating that some spawning had already begun offshore, but no significant recruitment of those postlarvae will probably occur until February 1966.

Average Catch Per Unit of Effort of Various Species at 18 Regular Survey Stations, October-December 1963-65.

			Blue Crabs		Shrimp	
Year	Croaker	Spot	Immature	Mature	Brown	White
1965	2.0	6.8	4.2	9.9	0.2	138.1
1964	13.7	18.5	16.2	9.5	1.4	39.8
1963	13.1	39.9	17.5	21.5	1.0	40.0

The table shows the considerable decline in abundance of croaker, spot, mature and immature blue crabs, and brown shrimp during the quarter as compared to the same period in 1963 and 1964.

Pond Cultivation: Several experimental ponds at Bears Bluff Laboratories were drained and harvested during October 1965. Results were good. In one experiment, a one-acre pond, which had been stocked during May-August 1965 with postlarval and juvenile white and brown shrimp, yielded about 220 pounds of shrimp when drained on October 15. The pond had been stocked heavily with over 18,000 shrimp which were fed about 600 pounds of chopped fish, crab, and commercial fish food during the culture period. Mortality was low in this experiment, particularly among the white shrimp, and about 14,500 (80 percent of those stocked) were harvested when the pond was drained. The pond was treated with rotenone twice to remove fish; crab pots were used to control crabs.

The size of the shrimp harvested were small, indicating that under the existing conditions of food and living space, stocking had been too heavy for maximum growth to take place.

A small one-tenth acre pond was drained on October 22, 1965, and a harvest which was equivalent to 250 pounds per acre was obtained. The pond had been stocked with 1,200 juvenile white shrimp in June and July. In June the pond had been previously drained and harvested for brown shrimp stocked earlier in the year. The total yield for the year for both species was equivalent to about 325 pounds to the acre.

Experiments testing the effects of superphosphate fertilizer on shrimp pond production were begun in December 1965, using several heated concrete tanks and a one-acre pond as well. It is well known that added phosphate can greatly increase productivity in fresh-water fish ponds, but little is known about the effects of such fertilizers in salt-water impoundments.

Note: See Commercial Fisheries Review, September 1965 p. 44.

U. S. Foreign Trade

AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-SEPTEMBER 1965:

Shrimp from Venezuela continued to be the main airborne fishery import into the

U. S. 1/Airborne Imports of Fishery Products, July-Sept. 1965 and January-September 1965 with Comparisons

Product and Origin 2/	July-Sept. 1965		Jan.-Sept. 1965		Jan.-Sept. 1964	
	Qty. 3/	Value 4/	Qty. 3/	Value 4/	Qty. 3/	Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
All countries . .	181.0	171.0	662.7	651.2	356.4	104.1
Shrimp:						
Venezuela.	1,112.9	592.1	8,831.2	4,518.6	4,671.2	2,202.4
Panama	223.0	161.6	815.4	532.5	812.8	499.1
Costa Rica . . .	-	-	104.8	50.2	296.1	161.2
El Salvador. . . .	-	-	28.1	19.1	159.1	96.8
Other countries	1.2	1.4	55.7	31.8	114.6	61.2
Total shrimp .	1,337.1	755.1	9,835.2	5,152.2	6,053.8	3,020.7
Shellfish other than shrimp:						
Canada	1.6	0.5	25.5	9.2	312.9	173.4
Mexico	7.5	8.9	8.7	9.9	14.4	9.9
British Honduras	94.9	125.4	171.1	182.9	207.3	165.5
Honduras	9.2	11.0	24.8	16.7	72.9	78.7
Nicaragua	5.4	3.0	109.5	115.0	50.5	40.0
Costa Rica	-	-	13.9	13.3	18.6	14.2
Jamaica	27.9	23.7	53.7	59.4	52.9	49.6
Other countries	37.5	42.5	146.7	119.7	54.5	24.4
Total shellfish (except shrimp)	184.0	215.0	553.9	526.1	784.0	555.7
Grand total . . .	1,702.1	1,141.1	11,051.8	6,329.5	7,194.2	3,680.5

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U.S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Exports & Imports by Air, FT 78S, January through September 1965, U.S. Bureau of the Census.

United States during the third quarter of 1965. In January-September 1965, airborne imports of fishery products into the United States totaled 11.1 million pounds with a value of $6.3 million. Airborne fishery imports increased 53.6 percent in January-September 1965 as compared with the same period in 1964 when smaller quantities of shrimp were shipped by air from Venezuela.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consisted of fresh and frozen products.

* * * * *

IMPORTS OF CANNED TUNA UNDER QUOTA:

United States imports of tuna canned in brine during January 1-December 31, 1965, amounted to 49,203,807 pounds (about 2,343,038 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was a decrease of 7.0 percent from the 52,930,989 pounds (about 2,520,523 standard cases) imported during January 1-December 31, 1964.

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty was limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.

Virginia

MARINE SCIENCE SUMMER TRAINING PROGRAM FOR HIGH SCHOOL STUDENTS:

The National Science Foundation has granted $8,500 to the Virginia Institute of Marine Science, Gloucester Point, Va., to operate a special class in marine science at a Norfolk, Va., High School during the summer of 1966.

The Institute has cooperated with the Norfolk school officials for the past four summers in presenting special courses in marine science to challenge exceptional secondary school students to higher achievement scholastically and to introduce them to the fascinating study of marine environment.

During those years 60 students and 10 high school teachers have participated in lectures, laboratory studies, and field work. They have studied ecological areas at ocean beaches, Eastern Shore, Gloucester Point, and other localities in tidewater Virginia. The program in marine science will be expanded this summer to accommodate 30 students rather than the 15 enrolled in previous summers. Five students are selected each year from other schools in Continental United States.

The outstanding feature of this program is the special ecological study conducted by students and teachers in the field. About two days each week are spent visiting various marine habitats and studying the marine plants and animals associated with them.

The program is to encourage capable young people to consider the possibilities of a career in marine science.

Note: See Commercial Fisheries Review, March 1965 p. 57, February 1965 p. 45.

Washington

EVALUATION OF COST AND PRODUCTION OF FISH FARMS:

An evaluation of the cost and production of each fish farm operated by the Department of Fisheries has been completed. The evaluation enables the Department to judge the worth of the fish farms in terms of salmon produced compared to the cost of construction, maintainance and operations.

Fish farms which have been found to be the best producers are being turned over to the Hatchery Division for operation.

Several areas will be retained by the Research and Management Division. In those ponds, experiments will be continued aimed at increasing the production and survival of fish-farm salmon. Techniques enabling high production of good quality young salmon in fish farms at a reasonable cost have yet to be found. Until better methods are devised, the main emphasis in artificial rearing will be the present hatchery system.

Several fish farms now considered borderline may prove valuable in future years. These will be deactivated and held in reserve.

Anderson Lake, Heines Lake, and Maylor Lagoon will be abandoned. Black Lake may be abandoned or planted only every other year due to residualism of young silver salmon in that lake.

The change in program and lack of funds makes it necessary to eliminate four positions in the Research and Management Division. The permanent fish farm staff of 3 biologists and 3 hatchery men will be reduced to 2 biologists. (Washington Department of Fisheries, January 19, 1966.)

Note: See Commercial Fisheries Review, October 1965 p. 58.

Weather

NEW RADIO BROADCAST NETWORK ESTABLISHED FOR MARINERS:

A network of 15 additional VHF radio stations, operating on a frequency of 162.55 megacycles, will be established by the Environmental Science Services Administration (ESSA), U. S. Department of Commerce, to provide mariners with continuous FM transmission of weather warnings, forecasts, and reports. The new radio stations will operate from ESSA's Weather Bureau offices along the Atlantic and Gulf coasts.

The stations, slated to be in operation before the start of the 1966 hurricane season next June, will be located at the ESSA Weather Bureau sites at Miami, Fla., Boston, Mass., Washington, D. C., Norfolk, Va., Atlantic City, N. J., Jacksonville, Fla., Charleston, S. C., Providence, R. I., Wilmington, N. C., New Orleans, La., Tampa, Fla., Lake Charles, La., and Brownsville, Galveston, and Corpus Christi, Tex. The Weather Bureau already operates continuous VHF broadcast stations in New York City, Chicago, and Kansas City.

Any craft carrying a suitable FM radio receiver within an approximate 40-mile radius of those cities will be able to receive the latest weather forecasts, warnings, and coastal station reports.

Weather bulletins will be prepared by Weather Bureau personnel and tape recorded. An automatic device will then replay the tape over the air. The taped message will be updated every three hours or more frequently during rapidly changing weather situations.

ESSA is a new agency of the U. S. Department of Commerce established in July 1965 to serve as a focus for national efforts to describe, understand, and predict man's natural environment. It includes the Weather Bureau, the Coast and Geodetic Survey, and the former Central Radio Propagation Laboratory of the National Bureau of Standards.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, JANUARY 1966:

The January 1966 wholesale price index for edible fish and shellfish (fresh, frozen, and canned) at 124.5 percent of the 1957-58 average was up 4.4 percent from the previous month and 11.1 percent from the same month in 1965. The increase from December was due primarily to much higher fresh haddock prices at Boston caused by the short supply. In January this year, prices for most of the fishery products that make up the wholesale price index were higher than in the same month in 1965.

Draggers unloading at docks of New York City's Fulton Fish Market, Jan. 1966. (Brooklyn Bridge in background.)

January 1966 prices in the drawn, dressed, or whole finfish subgroup were unchanged from December 1965 for western halibut and salmon at New York City and whitefish at Chicago. There was a 5.6-percent increase in fresh yellow pike prices at New York and a 60-percent increase in large fresh haddock at Boston. The index for all items in this subgroup was much higher than a year ago.

Fresh processed fish and shellfish prices were at the same level as December except for an increase of 8.8 percent in fresh shrimp

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1966 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Jan. 1966	Dec. 1965	Jan. 1966	Dec. 1965	Nov. 1965	Jan. 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					124.5	119.3	119.4	112.1
Fresh & Frozen Fishery Products:					127.7	120.6	122.7	118.3
Drawn, Dressed, or Whole Finfish:					138.3	123.4	128.5	121.8
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.24	.15	187.4	119.6	143.4	133.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	141.0	141.0	140.5	118.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	122.3	119.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.63	.63	93.3	93.3	85.8	90.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.75	.71	122.8	116.2	126.9	122.8
Processed, Fresh (Fish & Shellfish):					128.3	123.5	124.2	116.0
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.44	.44	105.7	105.7	115.4	134.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.99	.91	116.0	106.6	106.6	109.6
Oysters, shucked, standards	Norfolk	gal.	8.75	8.75	147.6	147.6	147.6	120.1
Processed, Frozen (Fish & Shellfish):					111.9	110.6	110.9	111.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	101.4	101.4	103.9	92.5
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	115.8	115.8	117.3	115.8
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	112.2	106.9
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.93	.91	110.3	107.9	107.3	112.1
Canned Fishery Products:					119.3	117.5	114.0	101.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	27.50	122.0	119.8	117.7	91.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.50	12.25	111.0	108.8	102.6	102.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	128.3

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

prices at New York. Haddock fillets and shucked oysters were unchanged. Compared with the previous year, the January 1966 index of fresh processed items was higher for all products except small haddock fillets which were down 21.6 percent.

Frozen fillet prices in January 1966 were at the same level as the previous month and generally higher than in January 1965. The subgroup index for frozen processed fish and fillets was up slightly from December due to a small increase in large shrimp prices at Chicago. Compared with January 1965, the current index was up very slightly but there was a mixed trend in the individual items.

The January 1966 subgroup index for canned fishery products rose 1.5 percent from the previous month. Prices for canned pink salmon and canned lightmeat tuna continued to climb while canned Maine sardines and California jack mackerel were unchanged. Prices for all items in this subgroup were much higher than a year ago and the index was up 17.2 percent. Stocks of canned pink salmon continued light, while the canned tuna market has tightened considerably.

International

FISH MEAL

WORLD PRODUCTION, OCTOBER 1965 WITH COMPARISONS:

World fish meal production in October 1965 was up 16 percent from the previous month, but down 38 percent from October 1964. Peruvian output showed some improvement in October 1965, but was still far below that in October 1964.

World Fish Meal Production by Countries, October 1965 with Comparisons

Country	October		Jan.-Oct.	
	1965	1964	1965	1964
	(Metric Tons)			
Canada	7,404	4,927	72,203	44,623
Denmark	12,578	13,074	103,683	99,645
France	1,100	1,100	11,000	11,000
German Fed. Repub.	6,190	6,369	57,404	63,545
Netherlands	505	900	4,884	6,700
Spain	1/	1/	2/ 13,247	1/
Sweden	688	673	6,089	5,973
United Kingdom	6,633	5,584	66,669	63,807
United States	11,517	7,780	190,096	187,528
Angola	1/	5,402	3/ 29,019	47,475
Iceland	14,734	13,064	120,436	115,309
Norway	32,021	15,815	285,680	162,630
Peru	41,463	130,492	951,553	1,189,562
So. Afr. (including S.-W. Afr.)	6,375	15,855	267,824	246,928
Belgium	375	375	3,750	3,750
Chile	885	10,743	52,581	124,979
Morocco	3,150	950	16,050	18,200
Total	145,618	233,103	2,252,168	2,391,654

1/Data not available.
2/Data available only for January-May 1965.
3/Data available only for January-September 1965.
Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in January-October 1965 was down about 6 percent from that in the first 10 months of 1964. Peruvian output was down 20 percent and Chilean production was also down sharply, but the decline was partly offset by increased production in Norway, Canada, and South Africa.

Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

* * * * *

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-NOVEMBER 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-November 1965

Country	November		Jan.-Nov.	
	1965	1964	1965	1964
	(1,000 Metric Tons)			
Chile	1.7	12.4	62.1	127.2
Angola	1/	4.2	2/ 30.1	52.0
Iceland	14.6	10.9	118.3	111.8
Norway	32.0	14.4	234.8	169.1
Peru	38.8	109.7	1,161.1	1,292.7
So. Africa (including S.-W. Africa)	14.4	18.7	209.1	212.7
Total	101.5	170.3	1,815.5	1,965.5

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-November 1965

Country	November		Jan.-Nov.	
	1965	1964	1965	1964
	(1,000 Metric Tons)			
Chile	1.9	9.6	54.4	134.6
Angola	1/	5.2	2/ 26.6	52.7
Iceland	30.9	3.2	151.4	118.5
Norway	19.3	13.1	305.0	175.8
Peru	116.7	181.7	1,068.3	1,371.6
So. Africa (including S.-W. Africa)	3.2	9.0	270.8	256.4
Total	172.0	221.8	1,876.5	2,109.6

1/Data not available.
2/Data available only for January-August 1965.

FOOD AND AGRICULTURE ORGANIZATION

NEW FISHERIES DEPARTMENT ESTABLISHED:

The Fisheries Division of the Food and Agriculture Organization (FAO) became a Department, consisting of two divisions, on January 1, 1966.

The decision to enlarge FAO's work in fisheries was made by the Organization's biennial Conference held in late 1965. The Conference also decided to establish a per-

International (Contd.):

manent 30-nation committee on fisheries, whose principal tasks are to review and propose solutions for conservation problems of an international character, and to advise FAO on its fisheries programs and policies.

Roy I. Jackson of the United States was appointed Assistant Director-General to head the new FAO Fisheries Department. Jackson had been in charge of the FAO Fisheries Division since May 1964. From 1955 until his FAO appointment, he was Executive Director of the International North Pacific Fisheries Commission.

The new FAO Fisheries Department will initially comprise two divisions--a Fishery Resources and Exploitation Division and a Fishery Economics and Products Division. Present FAO plans, approved by the Conference, call for the Department to grow to four divisions between 1966 and 1972.

F. E. Popper of Canada has been appointed Director of Program Coordination and Operations for the new Fisheries Department, and will act as deputy to Jackson. Popper has served with FAO since 1954 and was Deputy Director of the Fisheries Division during 1962-1965.

R. W. Harrison of the United States was named Acting Director of the new Fishery Economics and Products Division. S. J. Holt of the United Kingdom was named Acting Director of the Fishery Resources and Exploitation Division. (Food and Agriculture Organization, Rome.)

NORTHEAST ATLANTIC FISHERIES POLICING CONFERENCE

SECOND SESSION TO MEET IN LONDON:

The Northeast Atlantic Fisheries Policing Conference (NEAFPC) is scheduled to meet in London for its Second Session March 31-April 6, 1966. A technical committee meeting of the Conference is to be held at the start of the Second Session.

The NEAFPC grew out of a resolution adopted at the European Fisheries Conference (held in London, December 1963-March 1964), which called upon the United Kingdom to convene a conference to draw up a convention on rules of conduct for fishing vessels in the Northeast Atlantic.

The First Session of the NEAFPC met in London, April 6-9, 1965, and was attended by France, Germany, Italy, the Netherlands, Belgium, Denmark, Norway, Portugal, Sweden, the United Kingdom, Iceland, Ireland, Spain, the United States, Canada, Japan, Poland, and the U.S.S.R. (United States Embassy, London, January 12, 1966, February 5, 1965; and other sources.)

Note: See Commercial Fisheries Review, May 1964 p. 40.

SALMON

BALTIC SEA CONSERVATION AGREEMENT BETWEEN DENMARK, SWEDEN, AND WEST GERMANY RATIFIED:

The Baltic Sea Salmon Conservation Agreement between Denmark, Sweden, and West Germany was scheduled to go into effect March 1, 1966. Ratification of the agreement by all three countries was announced in January 1966. The agreement is reported to provide for:

(1) A minimum mesh size in drift gill nets of 165 mm. (6.5 inches) for natural fibers and 157 mm. (6.2 inches) for synthetic fibers, with a 5-year transition period for gear currently in use.

(2) A minimum width of 19 mm. (0.748 inches) between the point and shaft of hooks used in the long-line fishery.

(3) A minimum size of 60 cm. (23.6 inches) for salmon, measured from the tip of the snout to the extreme end of the tail.

Those salmon conservation measures in the agreement may also be placed in effect by the other Baltic Sea salmon fishing nations (U.S.S.R., Poland, and Finland), even though they did not ratify the agreement.

Salmon Catch in the Baltic Sea by Countries, 1963-1964

Country	1/ 1964	1963
	(Metric Tons)	
Denmark	1,721	1,133
Finland	465	368
Germany	2/	180
Poland	357	335
Sweden	631	371
U.S.S.R.	235	200

1/Preliminary.
2/Not available.
Source: International Council for the Exploration of the Sea.

There was a considerable increase in the Baltic Sea salmon catch in 1964. Preliminary estimates indicate that Denmark's 1965 Baltic Sea salmon catch will be about the same as in 1964. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 4, 1966, November 3, 1965, and September 15, 1965.)

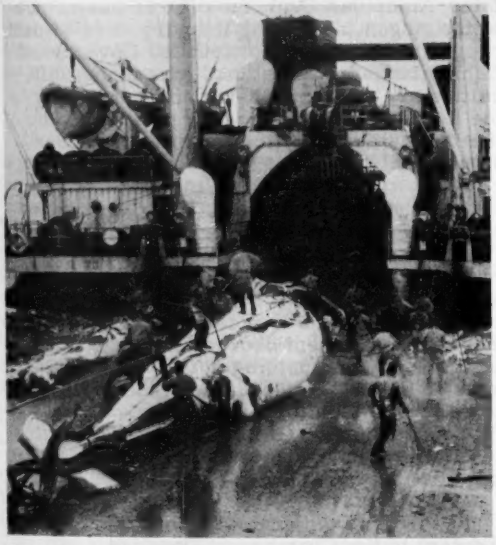
Note: See Commercial Fisheries Review, Nov. 1965, p. 44.

International (Contd.):

INTERNATIONAL WHALING COMMISSION

ANTARCTIC WHALING OPERATIONS, 1965/66:

Japan, U.S.S.R., and Norway are operating 10 whaling fleets in the 20th (1965/1966) Antarctic Whaling Expedition. This is a reduction of 5 fleets from the 19th (1964/1965) Expedition. Of the 10 fleets, 3 Japanese fishing companies have 5 fleets on the grounds instead of the 7 operated last year. The fleet reductions followed the action taken by the International Whaling Commission in reducing the international Antarctic whale catch from 8,000 blue-whale units (informally set by Antarctic whaling countries) for 1964/1965 to 4,500 blue-whale units for the 1965/1966 season.



Cutting up a whale for processing aboard a Japanese whaling factoryship in the Antarctic.

Japan's quota for the current year is 2,340 blue-whale units, 52 percent of the international quota. From the beginning of the baleen whaling season on December 15, 1965, to January 8, 1966, Japanese fleets landed 646 blue-whale units producing 11,376 tons of oil. The combined catch of the Antarctic whaling countries (Japan, U.S.S.R., Norway) during that period was 1,006 blue-whale units.

Current season hauls by the Japanese are significantly lower than during the same period in 1964/1965. On January 9, 1965, the catch by 7 Japanese fleets amounted to 1,307 blue-whale units. On a per-fleet basis, the average Japanese catch this year is 129 blue-whale units as compared with 186 last year. The average catch per fleet of the combined fleet (all countries) this year is 100.6 blue-whale units against 136.7 last year. (U. S. Embassy, Tokyo, Japan, January 25, 1966.)

* * * * *

BRAZIL TO WITHDRAW FROM COMMISSION:

The Brazilian Government has informed the International Whaling Commission that it desires to withdraw from the Commission, effective June 30, 1966. The basis for the proposed withdrawal is not known at this time. (U. S. Embassy, Lima, Peru, January 8, 1966.)

Argentina

FISHING INDUSTRY TRENDS, 1964 AND FIRST HALF OF 1965:

Catch and Production Highlights: The total Argentine fishery catch for 1964 was 160,306 metric tons. The 1964 sea catch of 143,587 tons was 30.1 percent higher than in 1963 and the fresh-water catch of 14,762 tons was 23.1 percent above the previous year.

During the first six months of 1965 the Argentine fishing fleets brought in 75,331 tons of fish, 6.8 percent above the catch for the corresponding period in 1964. The official estimate for 1965 is 15-20 percent above 1964. About 43 percent of that catch went to the canning, salting, freezing, and filleting plants, an increase of 4,045 tons over the same period in 1964; and about 45 percent went to the fish oil and meal processing plants.

The 1964 fresh and frozen fish fillet production of 20,986 tons practically doubled fillet production for 1963. It shows a continuing upward trend in 1965.

About 90 percent of the Argentine catch is delivered to the city of Mar del Plata which, due to location there of fish meal and fillet factories, is rapidly becoming the center of the Argentine fishing industry at the expense of other Argentine Atlantic coast ports.

Increased Imports: Argentina is using more of her fish catch internally and export-

Argentina (Contd.):

ing less. During 1964 Argentine exports of fish and products dropped to 4,585 tons from a 1963 level of 8,918 tons. Imports for 1964 rose to 4,746 tons from the 1963 level of 2,367 tons.

From January through June 1965 Argentina exported 1,798 tons of fish (610 tons of fresh, frozen, and canned fish, 657 tons of fish oil and 425 tons of fish meal). In the same period, she imported 10,741 tons of fish and products, including 8,140 tons of fish meal.

Fish Meal: In the first five months of 1965 Argentina was a net importer of 7,715 metric tons of fish meal. For the whole year of 1964 she was a net exporter of some 305 tons.

The development of production and trade in fish meal has accompanied the rapid expansion of pig and poultry farming in Argentina, and the increased use of fish meal as a protein additive in livestock feed. Argentine fish meal factories are working at peak capacity and should be able to reduce the high import level in 1966.

Internal Consumption: Total consumption of fish per person in Argentina rose in 1964 to 4.2 kilos (9.2 pounds), from 3.3 kilos (7.3 pounds) in 1963. Real consumption (fresh, frozen, canned) rose from 2.7 to 3.4 kilos (5.9 to 7.5 pounds). The trend continues up in 1965, but not quite so dramatically. There have been two beefless days per week in Argentina in an effort to release a part of national beef consumption for export; this is partly responsible for the increased fish consumption, and is also responsible for the increased use of fish meal as a feed additive in the expanding poultry and pig industry.

Fleet Shortage: In 1964 only one of the five existing fish oil and meal plants in the country was able to work at full capacity. This was due to a lack of fleet tonnage sufficient to provide large enough catches to operate the other four plants more than 8 to 12 hours a day.

The Argentine high-seas fleet consists of some 50 trawlers and the coastal and river fleet of some 350 launches and 27 boats. Seven high-seas trawlers with a total of 1,290 tons were added to the fleet in 1964 and 2 more large trawlers recently. Forty other fishing vessels of varying sizes are currently under construction under a Government-sponsored development program. The Argentine Government has assigned 2.0 billion pesos annually (about US$10.5 million) to be loaned at 8 percent interest for the integrated development of the fishing fleet and fish processing capacity. Six firms have made proposals to the Government for loans to start integrated operations consisting of fishing vessels, filleting and freezing plants, and fish oil and meal factories.

One of the principal bottlenecks of the Argentine fishing industry at this juncture appears to be a lack of sufficient high-seas trawlers, and a need to better understand the fishing grounds off the Argentine coast. The Inter-American Bank has offered assistance to the Argentine fishing industry development program, but despite announced Government fishing industry assistance loan plans, difficulties are currently being encountered by the industry in finding peso credit to match the funds offered by the Bank for new construction.

Government Activities: The Government recently froze the retail price of fish for consumption on the local market. Subsidies which the fishing industry had been receiving for purchases of fuel also were recently withdrawn, but a new bill recommends reinstating them. Other recent decrees have granted an exemption from customs duties for machinery imports related to the fishing industry, and given permission for Latin America Free Trade Association (LAFTA) member country vessels to fish Argentine waters under certain restrictions.

The Argentine Senate late in 1965 passed and sent to the Chamber of Deputies a bill looking to rationalization and intensification of the Argentine fishing industry. Thirty years ago Argentina produced more fish and products than any other South American country; today she ranks fourth behind Peru, Chile, and Brazil.

A UN/FAO team is currently making preliminary studies here which it is hoped will lead to a $3 million investment by those international organizations in Argentine fisheries research.

Under the auspices of FAO, Argentina, Brazil, and Uruguay have formed a regional

Argentina (Contd.):

commission for the study of fishing in the Southwestern Atlantic looking to coordinated regional development and exploitation of fishing resources.

Argentina is forming a National Institute for Fishery Studies to consist of members of the industry and interested government agencies.

Fish Meal and Fillet Freezing Plants: One Argentine firm in Mar del Plata is a consortium of fishing-fleet operators and fish processors which markets fresh fish and produces fish oil and meal. Another Mar del Plata firm processes hake which it fillets, freezes, and exports, mostly to the United States (where it is sold as "Argentine whiting"). The two firms process the catch from 17 high-seas trawlers and numerous coastal launches; the plants of the two firms process some 60 percent of the total Argentine high-seas catch.

One of the firms employs some 400 women to cut and clean the hake and quick-freeze it for export. Some 80 percent of that firm's frozen fish fillets are exported to the United States and the firm has received market inquiries from South Africa, Australia, and Japan. Part of the high-seas hake catch processed by that firm is sold fresh, packed in shaved ice and trucked into the interior; another part is sold in Buenos Aires supermarkets, which are just now beginning to have sufficient display refrigeration cases to handle such products.

The firm's fish meal plant uses both coastal catch and the filleting waste in its production of fish meal; thereby using the total catch from the consortium's vessels. The firm's fish-meal processing plant, which operates with Danish equipment, is the only one of the five fish meal plants in Argentina which was able to purchase sufficient catch to operate continuously in 1964 (three 8-hour shifts, seven days a week).

Both the Mar del Plata plants are efficiently laid out, clean, and managed for maximum input of high-seas and coastal catch and maximum output of salable products.

A lack of plate-freezing equipment for processing fillets is holding back the expansion of the one firm. That firm is unable to obtain the pesos needed for physical plant expansion to accommodate the proposed new freezing capacity.

Domestic demand for fish meal as a feed supplement, and international market demand for frozen fish fillets, appear practically unlimited. In 1964, one of the two firms had estimated that during 1965 he could sell some 21 million pesos worth of frozen fish fillets during the year: they have been selling 20 million pesos worth (about US$100,000) each month. The firm estimates that when they are able to install four new plant freezers which they are currently seeking to finance, they will be able to increase their fillet-processing operation from 2 shifts a day to 3, and increase their sales of fillets to 50 million pesos ($250,000) monthly.

These firms are believed to be representative to the extent that it can be said that the Argentine fishing industry urgently needs a large volume of new investment, both in ships and installations. (U. S. Embassy, Buenos Aires, Argentina, January 15, 1966.)

Note: 1 Argentine peso equals US$0.005.

Brazil

SHRIMP SHIPPED TO UNITED STATES FROM NEW PROCESSING FIRM:

In Brazil, a modern fish-freezing and processing plant at São Sebastião, north of the city of São Paulo, made its first shipment of frozen shrimp to the United States, November 15, 1965. The shipment of 70 metric tons was packed according to U. S. specifications and destined for a New York firm.

The fish-processing plant at São Sebastião was 18 months under construction and represents an investment of Cr. 2.5 billion (US$1.35 million), of which Cr. 1.3 billion ($700,000) had been spent by late 1965. Present production capacity is estimated at 200 tons of frozen fish and 40 tons of salt fish a month. Danish and German ice-making equipment can produce 90 tons in 24 hours. The plant has a cold-storage capacity for 800 tons of ice and 1,900 tons of perishable products. The firm plans to supply ice to local fishermen, from whom it buys fish at a fixed price, and is said to need a supply of 50 tons of fish a day for a profitable operation. The future installation of modern unloading equipment and other im-

Brazil (Contd.):

provements at the port of São Sebastião is also considered essential to the success of the new fish-processing operation. (U. S. Embassy, Rio de Janeiro, December 16, 1965.)
Note: Brazilian cruizeiros 1,850 equal US$1.00.

* * * * *

TUNA FISHERY DEVELOPMENTS, 1965:

About 16 species of tuna and tuna-like fish have been caught off the northeastern Brazilian coast. Yellowfin (Thunnus albacares) is reported to have accounted for about 50 percent of the commercial tuna catch in those waters and albacore (T. alalunga) for about 25 percent. Fishing takes place between July and January in two of the three general fishing grounds for yellowfin: (1) the area extending from French Guiana to the mouth of the Amazon and (2) from Parnaiba to Fortaleza. In the other half of the year (February to June), fishing is concentrated between latitudes encompassed by Cabo São Roque and the mouth of the São Francisco River. Distribution of albacore extends to the south, substantial quantities having been fished between Cabo Frio and Santos. Further oceanographic studies are needed to establish tuna fishing areas and their yearly variations.

One large Japanese vessel, line-fishing on the high seas along the Brazilian coast, reported a daily catch of from 15 to 30 tons of tuna, with the weight of individual species ranging from 50 to 700 pounds.

A small variety of albacore ("albacorinha") frequents northeastern coastal waters during certain periods of the year. Although "albacorinha" has been observed at the mouth of the Rio São Francisco and at the entrance of Bahia harbor, it is fished on a commercial scale only off the coast of Rio Grande do Norte. The fishing is done by sail boats varying from 7.5 to 9 meters (24.6-29.5 feet) in length with a crew of 3 men using a single line.

Line fishing is the principal method for tuna fishing, although tuna have been captured with almost every type of gear used in Brazil.

The only specialized tuna vessels used in Brazil were those owned by the two Japanese companies operating in Brazil from Santos and Recife, respectively. The firm out of Santos discontinued tuna fishing well over a year ago owing to problems encountered in training crews (two-thirds of which by law must be Brazilian citizens) and in maintaining the gear and vessels. According to officers of the company, high Brazilian production costs prevented them from competing in the international market. The firm's two long-liners were converted for use in general pelagic fishing operations. The firm out of Recife is understood to be operating one long-liner for tuna fishing, but to have encountered the same problems. Tuna is also caught in general fishing operations where other types of vessels are used. There are no present or prospective building programs for tuna vessels.

Shore-based facilities available for handling tuna consist of the general fishing depots (entrepostos) located at Fortaleza, Natal, Recife, Salvador, Rio de Janeiro, and Santos. All are badly in need of expansion and modernization of landing, handling, ice-making, and cold-storage facilities. There are innumerable plans for construction of such facilities, but progress in recent years has been negligible and, with the possible exception of SUDENE (Superintendency for the Development of the Northeast) financing for refrigerated warehouses in northeastern ports, there are no building programs for those facilities. There are no current technological developments in Brazilian tuna-handling methods.

Research on tunas is being carried out by SUDENE, by the Institute of Marine Biology at the University of Ceará, and by a joint research group at Santos sponsored by the University of São Paulo and the São Paulo State Secretariat of Agriculture. SUDENE has analyzed sample catches of tuna and other fish for age and weight, growth and reproduction cycles, dietary habits, etc. (United States Embassy, Rio de Janeiro, Brazil, January 14, 1966.)

Note: Dr. Melquiades Pinto Paiva of the University of Ceará is reported to have published papers on tuna in the Boletim de Estudos de Pesca which was issued by SUDENE through 1963. Lists of research papers on tuna are contained in FAO Report No. 1917 (Development of the Marine Fisheries Biology Research Program) and in FAO Fishery Report No. 27 (Report of the Second Session of the FAO Working Party for Rational Utilization of Tuna Resources in the Atlantic Ocean.)

Bulgaria

U.S.S.R. TO IMPORT TRAWLERS FROM BULGARIA:

Beginning in 1966 the Shipyards at Burgas, on Bulgaria's Black Sea coast, will specialize in the construction of fishing vessels. During Bulgaria's new 5-Year Plan (1966-1970), 220 fishing trawlers will be produced; of those, 120 will be exported to the Soviet Union which will operate them in the North Sea, the Barents Sea, and the Baltic Sea. This new series of trawlers will each have 300 horsepower motors; a displacement of 311 tons; and a length of about 30 meters (118 feet). Each trawler will be able to operate continuously for 19 days and nights without refueling; each will have a refrigeration hold with a volume of 100 cubic meters (3,531 cu. ft.) maintained at a constant temperature of -4° centigrade (24.8° F.). All processing will be fully mechanized. (Zemedelsko Zname, November 26, 1965, page 1.)

Editor's Note: The design for the new fishing trawlers was prepared by the Scientific Research and Design Institute of Shipbuilding of Varna. That Institute collaborates closely with similar institutes in the Soviet Union. The prototype of the new class was launched in early 1965, and serial production is to begin in early 1966. The U.S.S.R. probably placed the order with Bulgaria because of lower production costs as well as for trade and other considerations. It is believed that these additions to the Soviet fleet will serve mainly to replace obsolete Soviet trawlers built in the early post-World War II era in East Germany. They will not be used to further expand Soviet Baltic and North Sea operations.

Canada

TUNA CANNERY BEING BUILT IN NEW BRUNSWICK:

On November 4, 1965, construction began on an east coast Canadian tuna cannery in New Brunswick, between St. Andrews and St. Stephen. Total cost of the cannery will be about C$1.5 million.

To supply the plant, 3 tuna vessels (combination trawler-purse seine vessels) will be built at a cost of about C$6.0 million.

The cannery will have 60,000 square feet of space to handle 20 million pounds of tuna annually, and will be able to process 100,000 cans a day. The cannery is expected to employ 200 people from the surrounding area. The target date for the plant to be in operation is December 1966.

The tuna vessels built to supply the plant will each have a holding capacity for 1,000 tons of frozen tuna. The vessels will be capable of fishing anywhere in the world. For 8 months of the year they will probably operate in the southern Pacific. Through the Panama Canal, some Pacific grounds are actually closer to New Brunswick than to California. For the other 4 months of the year, the fleet is expected to fish the North and South Atlantic. (Trade News, November 1965, and other sources.)

Note: See Commercial Fisheries Review, Aug. 1964 p. 55; June 1964 p. 37; Jan. 1964 p. 44.

* * * * *

GROUNDFISH EXPORTS TO AUSTRALIA:

Three Nova Scotia firms have begun shipping groundfish to Australia. One hopes to sell a million pounds of fish to Australia in 1966. Another one exports to Australia all flounder in excess of its needs for the domestic market, and the third firm has been selling groundfish, mostly sole, to Australia since 1964. A representative of one of the firms said cod, flounder, and ocean perch are very well received in Australia. He explained that the Australian preference for those species may result from the large number of European immigrants who are used to eating Atlantic fish.

Canadian sales success in Australia could be at the expense of frozen fish products now shipped to Australia from Europe. The Canadians have comparatively low shipping costs via the Panama Canal and consider themselves competitive with European producers.

A Nova Scotia firm said it was cheaper to ship to Australia than to France because of routing problems to France. Monthly refrigerated vessel service is available between Halifax and Australia. (United States Consulate General, Halifax, January 6, 1966.)

* * * * *

LOBSTER-SPLITTING MACHINE DEVELOPED:

A prototype lobster-splitting machine has been developed by an engineer with the Canadi-

Canada (Contd.:

an National Research Council. In late 1965, the machine was undergoing further tests in the Maritimes. It splits top and bottom of the lobster shell, allowing the meat to be extracted quickly and without waste. The claws are put through the machine separately. The inventor estimates that the machine can split between 300 and 400 lobsters an hour. (Canadian Trade News, November 1965.)

* * * * *

LOBSTERS SHIPPED TO DENMARK:

Canadian lobsters, airfreighted to Denmark, compete successfully with those from Scotland and Norway. The Canadian lobsters sell for $2.30-2.45 a pound as compared with $3.25-3.85 for the others.

* * * * *

GOVERNMENT INCREASES EMERGENCY ASSISTANCE TO FISHERMEN FOR CATCH FAILURE:

An emergency assistance plan for fishermen suffering serious catch failure was announced by the Canadian Federal Government, December 3, 1965, and expanded January 15, 1966. As expanded, the emergency plan will supplement unemployment insurance in order to raise total benefits over a 3-months period to a maximum of $350 for fishermen with dependents and $200 for single fishermen. To be eligible for the emergency aid, fishermen must have 5 weeks of contributions to unemployment insurance. This is the first occasion on which the Canadian Government has made a direct payment to fishermen to compensate for loss of income due to failure of their catch. (Canadian Department of Fisheries, Ottawa, January 15, 1966.)

* * * * *

INSURANCE FOR FISH TRAPS AND SHORE INSTALLATIONS:

As of February 1, 1966, the Canadian Government began offering insurance in the Atlantic Coast provinces and British Columbia for fixed fishing gear (cod traps, herring traps, herring weirs, etc.) and shore installations (buildings only) against natural perils. The insurance is being offered on a 1-year experimental basis, and will cover assets valued from $300 to $15,000 for loss due to storms, ice, fire, etc., but not theft. It will pay 60 percent of appraised value on total loss, and a lesser indemnity for partial loss. Premium will be 1 percent of value. Coverage is an experimental extension of Canada's Fishermen's Indemnity Plan, which for the past 12 years has provided low-cost insurance for fishing vessels.

The new plan for fixed gear and shore installations will be reviewed after it has been in effect for 12 months, at which time a decision will be made as to whether or not it will be continued and if so, what amendments would be desirable. (Canadian Department of Fisheries, Ottawa, January 11, 1966.)

* * * * *

FEDERAL DEPARTMENT OF FISHERIES SETS UP NEW OFFICE TO ADMINISTER ECONOMIC AID:

The Federal Department of Fisheries of Canada has established a new position--director of special programs--to administer economic and other aid to the fishing industry. The new position was created in the course of a major reorganization in the Federal Department of Fisheries. Programs already in existence which will be administered by the new office include the Fishermen's Indemnity Plans, the Newfoundland Bait Service, and the Salt Assistance Plan. (Canadian Fishermen, January 1966.)

* * * * *

NEW TRADE COMMISSION OFFICE OPENED IN FAR EAST:

A new office of the Canadian Government Trade Commissioner Service has been opened in Kuala Lumpur to provide a more direct trade link with Malaysia, Burma, and Brunei.

The new office brings the number of Canadian Trade and Commerce posts abroad to 67.

Canadian imports from Malaysia in 1964 included frozen tuna valued at C$218,000. (Canadian Department of Trade and Commerce, Ottawa, December 15, 1965.)

* * * * *

FIRM BUILDING LARGE FISH-PROCESSING PLANT AT MORTIER BAY, NEWFOUNDLAND:

A Newfoundland plant to process 60 million pounds of fish a year for overseas export will be built at Mortier Bay by a Canadian firm, the Newfoundland Premier announced January

Canada (Contd.):

17, 1966. The operation will involve building a C$3-million plant, acquiring a dragger fleet, and training employees. Total investment by the firm will be more than C$13 million. February 1967 is the target date for completion. The Newfoundland Government actively sought the new plant and is pushing the development of groundfish processing for export. (Fisheries Council of Canada Bulletin, January 1966.)

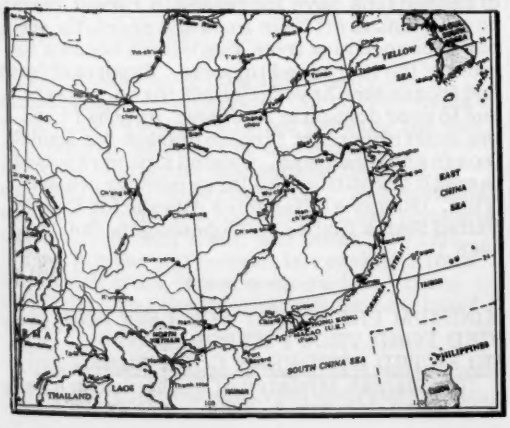
Another fish-processing complex is being set up at St. John's, Newfoundland, by a British firm and a Canadian firm with financial aid from the Canadian Government. Also, in 1965 another large British firm entered into partnership with one of Newfoundland's largest fish-processing firms.

Communist China

LOBSTER FISHING IN EAST CHINA SEA:

A large fleet of Communist Chinese and Japanese drag-net and trawl boats (some of 60 gross tons) were fishing in the East China Sea off the Shantung Peninsula early in 1966 and making rich catches of "taisho lobsters." The Japanese fishermen came from the fishing port of Shimonoseki.

The "taisho lobsters" caught in the East China Sea are most abundant during December-January. They are 20-30 centimeters (about 1 foot) long; as many as 10,000 were harvested per net in only 3 hours of trawling by at least one Japanese boat. The landings are easily sold in Japan where a good customer demand exists; each lobster brings about 40 yen (US$0.11) in wholesale markets. A good Japanese catch brought 20 million yen (about US$56,000) per boat and a captain could make up to $1,500 a trip.



Japan and Communist China have recently concluded a private fisheries agreement which makes it possible for Japanese fishermen to fish near Communist China's coasts. Large numbers of boats fishing in close proximity nevertheless cause gear conflicts and even collisions. (Asahi, January 4, 1966.)

Cuba

SOVIETS TRAIN CUBAN FISHERMEN:

By September 1964, a total of 483 Cuban fishermen had received training in the U.S.S.R. or on vessels of the Soviet fleet. It was expected that an additional 70-80 students would join that number during 1965-66; and 6 students were scheduled to enter Soviet universities.

Two Soviet fishery research vessels manned by crews of both countries will engage in an extensive research program using Havana as a base. Seven engineers will work temporarily in Cuba as technical advisers in planning the expansion of Cuba's fishing industry, and for two years, 36 Soviet specialists will work aboard six Cuban fishing vessels. (World Fishing, December 1965.)

Note: See Commercial Fisheries Review, Oct. 1965 p. 70; Dec. 1964 p. 90; Nov. 1964 p. 82; June 1963 p. 68.

Denmark

TUNA INDUSTRY TRENDS:

Fishing: Denmark's fishery for tuna is small and based entirely on bluefin tuna (Thunnus thynnus) taken mainly in the North Sea, the the Skagerrak, the Kattegat, and to a minor extent in the Sound. The North Sea was the principal tuna-fishing ground from 1955 to 1960 and the Kattegat from 1961 to 1964 (table 1). The fishery is conducted for the most part during the months of August, September, and October, with heaviest catches usually made in September. Bluefin tuna are caught on a

Denmark (Contd.):

Table 1 - Danish Tuna Landings, by Area of Catch and Months Fished, 1955-1964

Year	Quantity	Value	Principal Area	Months Fished
	Metric Tons	1,000 Kr.		
1964	46	126	SK-KT	Aug.-Sept.-Oct.
1963	3	14	-	Sept.-Oct.
1962	152	360	-	Aug.-Sept.-Oct.-Nov.
1961	144	317	-	Aug.-Sept.-Oct.-Nov.
1960	47	116	NS-	Aug.-Sept.-Oct.
1959	772	1,615	NS-	Aug.-Sept.-Oct.
1958	221	597	NS-	Aug.-Sept.-Oct.
1957	598	1,247	NS-	Aug.-Sept.-Oct.
1956	453	1,005	NS-	Aug.-Sept.-Oct.
1955	1,098	2,253	NS-SK-KT	Aug.-Sept.-Oct.

Notes: (1) Underlining indicates principal month and principal area.
(2) "NS" - North Sea; "SK" - Skagerrak; "KT" - Kattegat.
(3) 1 Danish krone = US$0.145.
Source: Fiskeriberetning, 1955-1964.

single hook, baited with herring or mackerel, attached to a line fished from a drifting cutter which has observed the tuna while fishing for herring or mackerel. Chumming with cut up herring or mackerel is practiced. A few tuna are caught incidentally in pound nets. Sportsmen troll for tuna, using herring or mackerel for bait, often selling the catch commercially.

The regular Danish fishing cutter is used in this seasonal fishery; the vessels seine or trawl for other species during the rest of the year. The number of vessels fishing for tuna in any one year fluctuates according to the availability of tuna and was estimated at about 25 vessels in recent years. There is no tuna vessel-building program.

The limited amount of tuna caught is landed at regular shore facilities used for landings of other species. Tuna is canned in 5 or 6 plants which pack primarily herring, brisling, mackerel, etc. There are no programs for building tuna vessels or processing facilities; no new technological developments in the handling of tuna are reported.

Biological research on tuna is conducted on a small scale. The Fishery Research Institute, Charlottenlund, Denmark, has studied the relationship of water temperature to the appearance of tuna in waters near Denmark. In addition, incidental tuna research is done during cruises of the Danish research vessel Dana. No technological research is being done.

Tuna Catch, Consumption and Trade: The Danish catch of tuna has fluctuated considerably during the last decade and has been almost negligible since 1959 (table 1). During the past few decades, the highest landings were 2,059 metric tons taken in 1952 and the lowest, 3 metric tons in 1963. The major part of the catch is consistently landed in Skagen, a fishing port on the northermost tip of Jylland Peninsula.

Danish consumption of tuna consists primarily of canned. A small quantity of Danish tuna landings is consumed fresh. Tuna is canned natural style and with tomato sauce. Danish canners use fresh Danish and Norwegian bluefin for the natural pack and frozen imported tuna, preferably dark meat, for the sauce pack. There are about 5 or 6 fish canneries which also pack tuna; a plant in Skagen probably has the largest production.

Table 2 - Denmark's Imports and Exports of Tuna, 1957-1964

Year	Imports			Exports		
	Fresh	Frozen	Canned	Fresh	Frozen	Canned
	(Metric Tons)					
1964	93.2	1,152.7	174.8	17.3	1.1	20.4
1963	21.0	25.1	121.2	3.4	-	9.0
1962	584.1	4.1	104.3	74.0	-	6.4
1961	222.2	-	94.0	25.6	-	5.1
1960	264.4	22.6	16.3	8.4	1.7	9.5
1959	166.0	0.1	12.7	94.9	346.5	11.0
1958	1/ 163.1	1/	11.1	1/ 7.8	1/	6.9
1957	1/ 271.7	1/	11.5	1/ 295.5	1/	11.6

1/ Fresh and frozen shown together.
Source: Danmarks Vareindførsel og - Udførsel, 1957-1964.

The trends in Danish tuna trade are shown in table 2. Nearly all the imports of fresh tuna are from Norway. A small amount includes fresh fish landed in Danish ports by Norwegian and Swedish fishermen. The large quantity of frozen tuna imported in 1964 was primarily from Japan. Canning that tuna saturated the Danish market and considerable effort was required to move the pack. Imports of canned tuna have increased in recent years; canned tuna in oil from Peru and specially prepared canned tuna from Yugoslavia account for most of the increased imports. Exports of fresh and frozen tuna have fallen off in recent years due to poor domestic landings. Italy had been the most important foreign market for Danish frozen and fresh tuna. Canned tuna is exported in small quantitites to a large number of countries. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, Jan. 26, 1966.)

* * * * *

MINIMUM PRICES SET FOR LIVE AND ICED POND TROUT EXPORTS TO SELECTED EUROPEAN COUNTRIES:

The Danish Ministry of Fisheries in a decree dated January 6, 1966, established min-

Denmark (Contd.):

imum export prices on exports of (1) live pond trout from Denmark to West Germany, Belgium/Luxembourg, the Netherlands, Switzerland, Austria, Sweden, Norway, and France and (2) iced pond trout to West Germany. The action was taken at the request of the Danish pond trout industry under legislation adopted June 4, 1965.

A Danish pond trout enterprise.

For iced trout to West Germany, the minimum export price (f.o.b. Danish border) is about 38.8 U. S. cents a pound for trout with a round weight of 8.82 ounces or over; on a drawn weight basis, the minimum price is 48.0 cents a pound.

For live trout, minimum export prices were set for specified trout sizes for each affected European country. The live trout minimum export prices (including freight and duty in some cases) range from 34.9 cents a pound to 80.7 cents a pound. The wide range is due partly to varying methods of computing freight and duty in the minimum prices for different countries.

The minimum prices reportedly are a compromise. Segments of the Danish industry are only partly satisfied because the decree covers only part of the trout exports--live trout and some ice-packed trout--and only part of the export market. Negotiations continue to extend coverage to other products, especially frozen trout, and other markets. Unless further agreement is reached within the Danish trout industry there is a strong possibility that the decree will be rescinded on April 1, 1966.

The minimum prices were established at a time when the Danish trout oversupply situation had been relieved. Actually the supply of Danish trout for export in early 1966 was reported to be in short supply. The situation was attributed to weather conditions in Denmark and reaction to overproduction early in 1965 which slowed the production rate during the latter half of 1965. Market prices for live trout in early 1966 were higher than the minimum set in the January 6 decree. The supply situation is also affecting stocks of frozen trout. A cooperative which accounts for about 45 percent of Danish production was not processing any frozen trout in early 1966.

January-November 1965 production of Danish pond trout was 10,143 metric tons, 29 percent higher than the 7,833 tons produced in the same period of 1964.

Danish exports of pond trout in January-November 1965 consisted of 1,961 tons of live trout valued at Kr. 14.4 million (US$2.1 million), 4,402 tons of fresh iced trout valued at Kr. 25.3 million ($3.7 million), and 3,560 tons of frozen trout valued at Kr. 25.2 million ($3.7 million).

Danish producers and exporters are seeking to set up a Joint Centralized Sales Office for frozen trout exports, especially for sales to the United States and Canadian markets. Motivating the effort to establish this new marketing office is the belief of many Danish trout exporters that a special sales office is needed to meet competition from Japanese exporters of frozen trout. (Assistant Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 19, 1966.)

Note: A loan copy of the report from the United States Embassy, Copenhagen, giving a detailed breakdown of the new Danish minimum pond trout export prices to certain European countries is available on loan, to firms in the United States only. To borrow Danish Report 554, dated January 19, 1966, write to the Branch of Foreign Fisheries, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240.

* * * * *

ICING REGULATIONS FOR FISH:

Danish regulations require icing of fish while in the auction hall, even at freezing temperatures. They are being enforced despite fishermen's protests because the Danish Fisheries Ministry's Technological Laboratory says ice in the boxes acts as an insulator and prevents the fish from drying out and becoming rancid when thawed. Fishermen ice their catches if out over 6 hours, but this may be extended to 8 hours.

* * * * *

Denmark (Contd.):

BALTIC SEA LUMPSUCKERS RICH SOURCE OF ROE FOR CAVIAR:

Lumpsucker roe is the source of Danish caviar. Lumpsuckers in the Baltic Sea yield much more abundant roe than those in the North Sea, according to a Danish biologist. His studies showed that Baltic Sea lumpsuckers yielded almost 2,000 eggs per ounce of fish as compared with slightly under 1,100 in the North Sea variety.

* * * * *

FROZEN PRODUCT LABELING REQUIREMENTS:

Beginning December 1, 1965, all Danish frozen products for domestic use, with a few exceptions, were required to carry on the label the net weight of the frozen product. Those containing sauce, soup, brine, water, etc., must also give the drained weight. A tolerance of 5 percent is permitted for net weight and 10 percent for drained weight, but the average weight of a reasonable number of packages must equal the labeled weight.

* * * * *

DATE MARKING OF FROZEN FISHERY PRODUCTS:

A large Danish fish processor began open (as opposed to coded) marking of the date of production on its frozen fish products on Jan. 1, 1965. Initially, only 20 percent of the frozen products consumed in Denmark are being marked with an open date. However, open-date marking will be offered to buyers in the 17 countries to which the company exports. In previous discussions of open-date marking, most processors have opposed it.

* * * * *

FISH PROCESSORS SEEK IMPORTED SUPPLIES:

Stable ex-vessel price levels for Danish fish landings can be maintained, according to processors, only if landings are sufficient to keep filleting and other processing lines producing near capacity continuously. The processors are seeking relaxation of import restrictions to augment deficient Danish landings of plaice, cod, and herring. The Danish Fisheries Ministry supports liberalization as in line with Denmark's international trade responsibilities. Fishermen, however, fear adverse effects on prices. As an alternative, the fishermen have increased herring landing quotas and urged larger landings by Swedish cutters under an existing special agreement.

* * * * *

FISHERY EXPORTS AND CATCH, 1965:

Preliminary estimates show that the Danish fishing industry can look back on a prosperous 1965 marked by exports valued at a record US$100 million and a catch only about 5 percent under the record 855,529 metric tons (almost 1.9 billion pounds) landed in 1964.)

* * * * *

GOVERNMENT FISHERY LOANS, FISCAL 1965:

Fishery loans made by the Royal Danish Fisheries Bank in fiscal year 1965 (April 1964-March 1965) totaled Kr. 20.2 million (US$2.9 million) as compared with Kr. 16.7 million ($2.4 million) the previous fiscal year.

A breakdown shows that in fiscal 1965 there were 64 new vessel loans with a total value of Kr. 11.6 million ($1.7 million), 14 used vessel loans totaling Kr. 1.4 million ($200,000), 24 fishery industry loans totaling Kr. 6.7 million ($970,000), and 17 miscellaneous loans with a toal value of Kr. 442,000 ($64,000).

In fiscal 1964, there were 74 new vessel loans with a total value of Kr. 11.9 million ($1.7 million), 8 used vessel loans with a total value of Kr. 515,000 ($75,000), 22 industrial loans totaling Kr. 3.7 million ($530,000), and 116 miscellaneous loans (including 95 loans for ice damage) with a total value of Kr. 615,000 ($89,000).

Losses on loans during fiscal 1965 amounted to Kr. 43,082 ($6,247). Funds on loan increased to Kr. 106.8 million ($15.5 million) in fiscal 1965. The Bank operated under amended Fishery Bank Law No. 170, April 27, 1963, which extended operations to include Greenland in addition to Denmark and the Faroe Islands.

During fiscal 1965, loans were financed by 3 series of bonds issued by the Bank which pay 6 and 7 percent interest. When a loan is approved, the applicant receives bonds for the amount of the loan and must sell them to receive his funds. The market value of the bonds is less than their face value. The bonds were

Denmark (Contd.):

quoted at a discount of about 15 percent in early December 1965.

In late 1965, a representative of the Danish Fisheries Association (mostly vessel owners) complained about the expenses incurred by fishermen building vessels, especially the 15-percent loss in selling the loan bonds. For a modern steel cutter costing Kr.1.2 million ($174,000), the owner must supply 20 percent of the cost--Kr.240,000 ($34,800)--plus Kr. 50,000 ($7,250) for gear, and Kr.180,000 ($26,100) to make up the loss on the sale of bonds for a total of about Kr.470,000 ($68,150).

Fishing vessel owners are aided by favorable vessel depreciation regulations. For example, tax-free depreciation may be claimed annually on fishing vessels up to 30 percent of the book value. Advance tax-free depreciation is allowed on vessels when the construction price aggregates at least Kr. 200,000 ($29,000). Depreciation may be claimed for the first time in the year when a contract to build a vessel is concluded, and each year thereafter preceding the year delivery takes place. The total amount of advance tax-free depreciation may not exceed 30 percent of the contract price. The annual rate of advance depreciation is optional to the vessel owner, but may not exceed 15 percent in any one fiscal year. (Regional Fisheries Attache, United States Embassy, Copenhagen, December 15, 1965.)

* * * * *

FISHING VESSEL LOAN FUNDS NEARLY EXHAUSTED:

The Government-guaranteed fund of nearly US$22 million for the Danish Fisheries Bank was almost exhausted in late 1965 just as demands were increasing because of tightening credit in Denmark. Industry representatives were seeking a further guarantee of $14 million to meet the demand for cutter construction funds stimulated by 1965's near-record landings and relatively high prices. About 100 new cutters are reported ordered for delivery in 1966 and 1967.

* * * * *

EX-VESSEL FISH PRICES, NOVEMBER 1965:

Landings of most Danish fish brought higher prices in 1965 than in 1964. Average November 1965 prices (November 1964 in parentheses) in U. S. cents per pound ex-vessel were: cod 8.6 (8.3); plaice 20.2 (15.1); industrial fish 2.1 (1.45); herring 5.6 (4.2); haddock 9.4 (7.7), and dogfish 7.8 (6.5). A few prices declined: salmon $1.10 ($1.19); ordinary lobster 89 ($1.17); and shrimp 29.6 (38.8).

East Germany

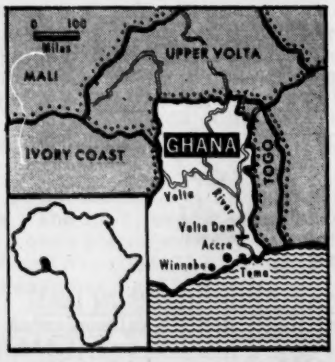
FISHERY TRENDS, LATE 1965:

An East German trade delegation visiting Danish fishing ports the latter part of 1965 said East Germany's fishing fleet was increasing steadily and the country was about to become self-sufficient with regard to fish. However, because Denmark delivered such a quality fresh product, East Germany still had a buying interest in Danish fish.

Ghana

NORWAY DELIVERS LAST OF SEVEN STERN TRAWLERS:

The last of seven stern trawlers built by a Norwegian shipyard for the Ghana State Fishing Corporation was delivered in Trondheim early this year. Named the Agyimfra, the vessel is a sistership of the other six motor



trawlers. The vessel is 231 feet long, has freezing facilities for 24 metric tons of fish a day, and has a hold capacity for 35,000 cubic feet of fish. (The Export Council of Norway, January 1966.)

Greece

FISHERY TRENDS, JANUARY-AUGUST 1965: Atlantic Freezer-Trawler Fishery: Landings by the Atlantic fleet of Greek freezer trawlers in January-August 1965 totaled 16,029 metric tons as compared with 13,135 tons in the same period of 1964. Greek freezer trawlers reported slightly improved fishing conditions off West Africa in August 1965. The catch included smaller amounts of horse mackerel but larger quantities of sea bream. The shrimp catch was insignificant. Weather hampered fishing in the northern section of the African grounds.

Shrimp Fishing Venture in the Persian Gulf: A new Greek shrimp-fishing venture got under way in late August 1965 when four Greek trawlers sailed for the Persian Gulf. Plans called for the trawlers to deliver their Persian Gulf shrimp catch to the Greek freezer-trawler Evangelistria for freezing and transport. The venture is sponsored by a Greek fishing company operating under a permit of the Iranian Government.

Kuwait Shrimp Fishing Attracts Greek Technicians: An experienced Greek trawler skipper reportedly has been appointed technical manager of a newly established Kuwait shrimp-fishing company. The new company is said to be building wooden fishing vessels of up to 100 tons in Kuwait. The vessels are to be fully equipped with fish-finders and other electronic equipment. The first vessel was reported ready for launching in August 1965. The Kuwait company was seeking Greek skippers, engineers, and fishermen to man its new vessels. (Alieia, September 1965.)

Note: See Commercial Fisheries Review, January 1966 p. 74.

Greenland

SALMON CATCH DECLINES IN 1965: The Greenland inshore salmon catch will total only about 700 metric tons (1,540,000 pounds) in 1965 as compared to 1,400 tons (3,080,000 pounds) in 1964. The decline was due to lower prices to the fishermen, a change in availability as indicated by larger catches farther north, and better cod fishing. Market prices are recovering from the unexpectedly large catch in 1964.

Fishing offshore from Greenland in the fall of 1965, a Norwegian vessel caught about 12 tons of salmon and the Faroese gill-net vessel Bakur caught about 40 tons. The salmon on the Bakur averaged about 10-13 pounds each and were of good quality when landed in Denmark. The Bakur's salmon catch was taken during about 3½ months of fishing, mostly 3 to 12 miles off Greenland. A Danish processor paid about US$1.28 a pound for the Bakur's salmon.

The financial success of the Bakur's trip, together with the knowledge of offshore salmon fishing that has been gained, makes it reasonably certain that at least a few vessels will fish for salmon again off Greenland in the fall of 1966. The Bakur might be replaced by a smaller vessel which could fish gill nets more effectively. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 10, 1966.)

* * * * *

SHRIMP FISHERY TRENDS IN 1964 AND FUTURE OUTLOOK: In 1964, the Greenland catch of heads-on shrimp amounted to 3,770 metric tons, up 13 percent from the 3,341 tons landed in 1963. The Royal Greenland Trade Department (RGTD) processed about 95 percent of the 1964 catch and the remainder was handled by private companies. Output in 1964 included 379 tons of canned or jarred shrimp (166 tons hand-peeled and 213 tons machine peeled) and 407 tons of frozen shrimp. In 1964, exports of frozen shrimp from Greenland by the RGTD totaled more than 290 tons, with 186 tons to Denmark and the remainder to other European countries. Exports of canned and jarred shrimp from Greenland in 1964 went to 66 countries; Denmark was the leading buyer, followed by the United States, West Germany, the United Kingdom, Finland, and Switzerland.

The Greenland shrimp fishery has shown a steady rise in past years and should continue to grow. According to biologists, the resource can support a much larger fishing effort. Efforts in marketing, processing, and fishing will probably be the measure of future growth in the Greenland shrimp industry.

In recent years, good shrimp prices and the generous subsidy and loan program of the Danish Government have enabled many Green-

Greenland (Contd.):

land fishermen to own their own shrimp vessels. Those craft have generally tended to be between 10 and 20 gross tons. Vessels in that category are eligible for a subsidy covering 20 percent of the total cost and a loan covering 70 percent of the cost (repayable in 15 years at 4 percent annual interest). Thus a shrimp fishermen may have to provide only 10 percent of the initial cost to acquire a vessel. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 28, 1965.)

Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, NOVEMBER 30, 1965:

As of November 30, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 1,010 metric tons, a decline of 1,614 tons from the stocks on hand October 31, 1965. (United States Embassy, Reykjavik, December 27, 1965.)

Icelandic Export Stocks 1/of Principal Fishery Products, November 30, 1965

Item	Qty.	Value	
	Metric Tons	Million Kr.	US$ 1,000
Groundfish, frozen:			
for export to:			
U. S.	1,010	26.9	624.7
other countries	4,388	83.4	1,936.8
Stockfish	1,230	38.1	884.8
Herring, frozen	4,645	26.5	615.4
Industrial products:			
fish meal:			
herring	44,126	370.7	8,608.9
other fish	1,868	13.9	322.8
herring oil	48,653	384.4	8,927.1

1/Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US$1.00.

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and slabs, 4,669 metric tons of cod fillets, 2,791 metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.

* * * * *

EXPORTS OF FISHERY PRODUCTS, JANUARY-OCTOBER 1965:

During January-October 1965, there was an increase in exports of salted fish, herring and other fish on ice, frozen herring, canned fish, herring oil, herring meal, and ocean perch meal, as compared with the same period in 1964, according to the Icelandic periodical Hagtidindi, November 1965. Exports of frozen fish fillets, cod-liver oil, salted herring, whale oil, and fish meal showed a considerable decrease in the first 10 months of 1965.

Icelandic Fishery Exports, January-October 1965 with Comparisons

Product	Jan.-Oct. 1965 Qty.	Jan.-Oct. 1965 Value f.o.b.		Jan.-Oct. 1964 Qty.	Jan.-Oct. 1964 Value f.o.b.	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Salted fish, dried	2,314	46,221	1,072	890	22,532	523
Salted fish, uncured	23,558	394,156	9,144	22,821	353,123	8,192
Salted fish fillets	1,512	25,624	594	1,047	15,280	354
Wings, salted	1,470	19,877	461	1,173	14,765	343
Stockfish	9,688	293,995	6,821	9,225	260,876	6,052
Herring on ice	1,866	1,206	28	19	140	3
Other fish on ice	44,436	152,142	3,530	27,415	162,846	3,778
Herring, frozen	18,752	119,422	2,771	16,250	96,939	2,249
Other frozen fish, whole	5,403	63,914	1,483	3,257	35,404	821
Frozen fish fillets	43,767	1,011,132	23,458	48,085	960,351	22,280
Shrimp and lobster, frozen	816	103,688	2,406	1,028	94,594	2,195
Roes, frozen	1,934	30,166	700	1,624	26,652	618
Canned fish	537	23,446	544	310	15,411	358
Cod-liver oil	5,398	57,066	1,324	9,132	84,593	1,963
Lumpfish roes, salted	851	44,918	1,042	419	10,609	246
Other roes for food, salted	2,033	33,530	778	2,644	39,515	917
Roes for bait, salted	826	8,749	203	3,049	25,280	586
Herring, salted	19,920	239,142	5,548	31,689	348,528	8,086
Herring oil	59,086	496,357	11,515	36,330	284,868	6,609
Ocean perch oil	-	-	-	28	188	4
Whale oil	3,066	28,184	654	3,782	32,322	750
Fish meal	18,123	121,991	2,830	25,354	157,552	3,655
Herring meal	83,473	606,891	14,075	75,403	453,151	10,513
Ocean perch meal	2,689	19,763	459	1,894	11,084	257
Wastes of fish, frozen	8,954	32,834	762	6,196	19,690	457
Liver meal	569	4,042	94	502	3,323	77
Lobster and shrimp meal	50	231	5	156	686	16
Whale meal	1,254	7,964	185	1,211	6,694	155
Whale meat, frozen	2,571	23,000	534	1,928	15,322	355

Note: Values converted at rate of 1 krona equals 2.32 U.S. cents.

FISHERY CATCH AND TRENDS, 1965:

In 1965, Iceland's fish catch was a record 1,166,000 metric tons, according to preliminary data from the Fisheries Association of Iceland. That was a gain of almost 20 percent from the previous record catch of 971,574 tons in 1964.

Most of the Icelandic catch goes for export products. The f.o.b. export value of the 1965 catch has been conservatively estimated at Kr. 5,300 million (US$123 million), a 15-percent increase over 1964.

The 1965 catch was marked by a sharp rise in the herring catch, but a drop in the higher-valued groundfish catch. The 1965 herring catch totaled 753,000 tons (a 38-percent increase over 1964). However, the groundfish catch in 1965 declined 13 percent to about 361,000 tons from 415,305 tons in 1964.

Iceland (Contd.):

The 1965 catch also included 50,000 tons of capelin (8,000 tons in 1964) and 4,000 tons of shellfish (3,173 tons in 1964).

The big increase in the herring catch was attributed to modern vessels and fish-finding equipment (without which the season would have been poor), and to the buildup in the herring fleet at the expense of groundfish operations. The scattered shoals of cod found in 1965 made fishing for groundfish less attractive.

The reduced catch of groundfish will force some restriction in Iceland's expanding markets for frozen fish blocks and fillets, while the tremendous herring catch will increase Icelandic reliance on the more volatile world markets for fish meal and oil. (United States Embassy, Reykjavik, January 6, 1966.)

* * * * *

FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-AUGUST 1965:

Species	January-August	
	1965	1964
	(Metric Tons)	
Cod	211,645	262,181
Haddock	36,783	36,971
Saithe	19,268	17,917
Ling	3,488	3,635
Wolffish (catfish)	7,011	7,894
Cusk	1,296	2,794
Ocean perch	20,987	20,904
Halibut	597	800
Herring	347,317	350,375
Capelin	49,611	8,640
Shrimp	408	202
Other	10,194	9,504
Total	708,605	721,817

Note: Except for herring which are landed round, all fish are drawn weight.

* * * * *

UTILIZATION OF FISHERY LANDINGS, JANUARY-AUGUST 1965:

How Utilized	January-August	
	1965	1964
	(Metric Tons)	
Herring and capelin[1/] for:		
Oil and meal	360,818	311,404
Freezing	14,317	13,535
Salting	21,639	33,983
Groundfish[2/] for:		
Fresh on ice	24,090	23,748
Freezing and filleting	144,351	158,372
Salting	79,092	84,635
Stockfish (dried unsalted)	49,396	80,667
Canning	186	117
Oil and meal	2,096	2,923
Crustaceans for:		
Freezing	2,729	2,631
Canning	123	36
Home consumption	9,768	9,766
Total production	708,605	721,817

1/Whole fish.
2/Drawn fish.

Japan

CANNED TUNA MARKET SURVEY IN WEST GERMANY:

The Japan External Trade Promotion Organization (JETRO) has released a report on the canned tuna market survey conducted by that organization in West Germany in 1965. According to the report, West Germany is the second largest market after the United States for Japanese canned tuna exports. Unlike the United States, which primarily imports canned tuna in brine, West Germany imports predominantly lightmeat tuna packed in oil. Other suppliers of canned tuna to West Germany include such countries as Yugoslavia, Peru, Malaysia, and Spain. It was not known to what extent their products competed with Japanese exports and so the survey was conducted to study the canned tuna demand and supply relationship in West Germany and to obtain other basic information in an attempt to ascertain the attitude of German distributors and consumers toward Japanese canned tuna and other competing products.

The JETRO survey revealed the following facts:

1. Imports of canned tuna by West Germany have been trending upwards in recent years, with 21 countries now supplying canned tuna to that country. Imports from Japan, which account for over one half of the trade, are increasing, whereas imports from Yugoslavia and Peru are declining.

2. Canned tuna packed in West Germany and Spain is superior to that packed in other countries, but the German production and Spanish exports to West Germany are very small. Consequently, they have not affected Japanese exports to that country. Japanese canned tuna is highly regarded by German buyers and consumers for its quality. A prominent German fish importer who was asked why he thought Japanese canned tuna led all other similar imports by his country remarked that Japanese products consistently maintained a high quality.

3. The City of Berlin reportedly maintains a reserve supply of 20 million cans of tuna for emergency use, which are stored for a period of 10 years and then replaced with a fresh stock. In West Germany, the people seem to particularly favor lightmeat tuna packed in oil. Many German housewives consider bluefin to make the best tuna pack, followed in

Japan (Contd.):

order by yellowfin, skipjack, albacore, and big-eyed.

4. The emergence of Japanese canned tuna on the West German market may appropriately be called an "overwhelming development." Like canned tangerine, Japanese canned tuna products have created a wonderful image in the minds of German consumers. However, despite this favorable condition, sales are not expected to show any appreciable gain. This is because the West German market today abounds in all sorts of attractively packaged, eye-catching foods which are being extensively promoted and which are creating a deep impression on the consumers.

5. Under the present Japanese production setup, where tuna processors pack their products under numerous brands, it is probably impossible to reduce the number of brands to 2 or 3. However, it is believed that greater stress could be laid on promoting the identity of Japanese products and thereby enhancing their image. A great potential exists for expanding the West German canned tuna market, and it is no exaggeration to say that it is fully possible to increase the present volume of canned tuna sales by about 40 percent within the next 1 to 1½ years. (Suisan Keizai Shimbun, December 9, 1965.)

* * * * *

TUNA CANNED IN BRINE EXPORT SALES TO U. S. RESUMED:

Sales of Japanese canned tuna in brine for export to the United States had been suspended since December 1, 1965, due to deadlocked negotiations between tuna packers and exporters over conclusions of a new exporters agreement (exporters agreement for business year 1965 expired November 30, 1965). Sales were temporarily resumed when the Government on December 24, 1965, announced that it would apply the interim export validation standard based on the Trade Control Ordinance to permit exports until January 31, 1966. During the two months, the Government was to validate canned tuna in brine exports totaling 500,000 cases, to be allocated to exporters on the basis of a 70-percent past performance quota and a 30-percent adjustment quota. For the December sales, the Japan Canned Tuna Sales Company planned to offer 180,000 cases (150,000 cases of whitemeat tuna and 30,000 cases of lightmeat tuna).

Price negotiations, which had been in progress between the Sales Company and exporters, were settled on December 24, 1965, resulting in raising the export prices an average of 70 cents a case for canned whitemeat tuna and 20 cents a case for canned lightmeat tuna. The new f.o.b. Japan prices went into effect in December; they are base prices and exclude promotional allowances heretofore granted to exporters and premiums previously paid to packers to encourage production. (Suisan Tsushin, December 27, 1965.)

* * * * *

ALBACORE TUNA EX-VESSEL PRICE TRENDS, DECEMBER 1965:

Small quantities of albacore tuna were being landed in December 1965 at such ports as Kesennuma and Shiogama in northeastern Japan by long-line vessels engaged in the winter albacore fishery. The ex-vessel price of albacore landed at those ports was:

Port	Date	Ex-Vessel Price	
		Yen/Kg.	US$/Short Ton
Kesennuma	Dec. 13	180-217	454-547
Shiogama	Dec. 14	220-260	554-655
Kesennuma	Dec. 15	130-200	328-504
Shiogama	Dec. 15	188-233	474-587

The high price paid for albacore at that time of the year was due to increased domestic demand in Japan for all varieties of fish for the holiday fresh fish trade. (Suisan Keizai Shimbun, December 14-16, 1965.)

* * * * *

ALBACORE TUNA EXPORT QUOTA TO U. S. INCREASED:

The Japan Export Frozen Tuna Producers Association, at a meeting December 16, 1965,

Tuna Pack	Can & Case Size	New Base Price	Old Price
		(US$/Case)	
Whitemeat	7-oz. 48's	9.70	9.50 (incl. 60¢ advertising allowance)
"	13-oz. 24's	8.95	8.80 (" " " ")
"	4-lb. 6's	10.40	10.10 (" 30¢ promotional allowance)
Lightmeat	7-oz. 48's	8.15	7.35 (" 60¢ premium to packers)
"	13-oz. 24's	7.90	7.15 (" 60¢ " " ")
"	4-lb. 6's	8.75	8.45

Japan (Contd.):

decided to use 5,000 short tons of the 15,000-ton adjustment quota for exporting frozen round albacore directly to the United States from Japan proper. The albacore export quota (for direct shipment to the United States) had been set at 30,000 short tons for fiscal year 1965 (April 1965-March 1966) but that quantity was expected to be arrived at by early 1966. (Suisan Tsushin, December 13 & 17, 1965.)

* * * * *

FROZEN TUNA EXPORT PRICES TO ITALY, DECEMBER 1965:

The price of Japanese frozen dressed yellowfin tuna exported to Italy continued to trend upwards and record new highs. Towards mid-December 1965 it was US$490-495 a metric ton c.i.f., compared to the November 1965 price of $455-460. In 1964, the average Japanese export price for yellowfin to Italy was $409 a ton; in 1963, $394.

In December 1965, other c.i.f. prices of Japanese dressed frozen tuna transshipped to Italy were: bluefin $455-460 a metric ton (1964 high $390, 1964 average price $339); big-eyed $390 (1964 high $360, 1964 average price $276).

The rapid increase in the price of Japanese tuna exported to Italy is attributed to: (1) expansion of processing facilities and increase in consumer demand for canned tuna in Italy; (2) shortage of supply of tuna as a result of the rapid decline in Japanese fishing effort in the Atlantic, which earlier in 1965 consisted of about 160 vessels but in December 1965 only 100 long-liners; and (3) the large drop in the catch of yellowfin tuna. (Suisan Tsushin, December 14; Katsuo-Maguro Tsushin, November 26, 1965.)

* * * * *

COMPANY INCREASES ATLANTIC OCEAN TUNA PURSE-SEINING EFFORT:

A fishing company announced at a press conference on December 17, 1965, plans to dispatch in 1966 two additional pairs of two-boat seiners to West Africa to join that firm's mothership-type purse-seine fleet (led by the 1,600-ton mothership Chichibu Maru No. 2). Despite large losses suffered from the 1965 operations, the fleet was successful in catching a total of 4,000 metric tons of fish (consisting of 50 percent yellowfin, 40 percent skipjack, and 10 percent miscellaneous species), and the fishery was considered to hold promise. (Suisan Tsushin, December 18, 1965.)

* * * * *

TUNA PURSE SEINER REPORTS GOOD FISHING IN SOUTH PACIFIC:

The Japanese purse seiner Taikei Maru No. 23 (212 gross tons), which left Japan, December 3, 1965, on a tuna fishing trip to the southwest Pacific Ocean, began fishing off New Guinea around December 13. She unexpectedly encountered good fishing, taking a full load in one week. She was scheduled to be back in Japan around December 27 or 28 with 65 metric tons of skipjack and 250 tons of yellowfin tuna. (Katsuo Maguro Tsushin, December 22, 1965.)

* * * * *

FIVE TRAWLERS TO CONDUCT WINTER OPERATIONS IN GULF OF ALASKA:

Japan expected to have a total of five large stern trawlers operating in the Gulf of Alaska during winter 1965/66. They include the Taiyo Maru No. 82 (2,886 gross tons), Daishin Maru No. 12 (2,967 gross tons), Takachiho Maru (3,494 gross tons), Koyo Maru (2,521 gross tons), and Akebono Maru No. 53 (1,450 gross tons). The Taiyo Maru No. 82 in early December 1965 was already on the fishing grounds (since September), as was the Daishin Maru No. 12 which departed Japan, November 26. Scheduled departure dates for the other three vessels were: Takachiho Maru, December 10, Koyo Maru, December 14, and the Akebono Maru, late January or early February 1966. The 276-ton fishing vessel Fukuho Maru reportedly will fish for the Koyo Maru but as of early December her port departure had not been fixed.

Akebono Maru, large Japanese stern trawler fishing in the Gulf of Alaska during the winter of 1965/66.

It is also reported that another fishing company will dispatch a 2,400-ton stern trawl-

Japan (Contd.):

er to the Gulf in April 1966. On December 10, the Fisheries Agency announced the issuance of a construction permit to that firm. The trawler is to be constructed at a shipyard in southern Japan. (Suisancho Nippo, December 14; Suisan Keizai Shimbun, December 7, 1965.)

* * * * *

FISHING PLANS FOR 1966 IN BERING SEA-GULF OF ALASKA:

Applications submitted to the Fisheries Agency by firms planning mothership-type trawl fisheries in the Bering Sea and Gulf of Alaska show that Japan plans to operate in 1966 a total of 14 motherships accompanied by 208 catcher vessels in the Bering Sea and 11 motherships accompanied by 11 catcher vessels in the Gulf of Alaska. The previous year 13 motherships and 175 catchers operated in the Bering Sea and in the Gulf about

Table 1 - List of Mothership-Type Bottomfish Fleets Planning to Operate in the Bering Sea in 1966 1/

Mothership	Size	Catcher Vessels
	Gross Tons	No.
Soyo Maru	11,192	25
Tenyo Maru	11,581	15
Einin Maru	7,482	16
Gyokuei Maru	10,357	30
Shikishima Maru	10,144	23
Aso Maru	3,499	1
Chichibu Maru	7,472	12
Meisei Maru No. 2	9,300	11
Kashima Maru	7,163	18
Tenyo Maru No. 3	3,698	1
Seifu Maru	8,269	23
Hoyo Maru	14,111	29
Kotoshiro Maru No. 28	572	2
Shinano Maru	535	2

1/Subject to Fisheries Agency approval.

Table 2 - List of Japanese Bottom-Trawl Fleets Planning to Operate in the Gulf of Alaska in 1966 1/

Mothership	Size	Catcher Vessels
	Gross Tons	No.
Taiyo Maru No. 82	2,886	1
Takachiho Maru	3,494	1
Akebono Maru No. 53	1,450	1
Daishin Maru No. 12	2,967	1
Kirishima Maru	3,495	1
Undesignated	2,500	1
Koyo Maru	2,521	1
Under construction	3,500	1
Ryuho Maru	1,950	1
Undesignated	2,400	1
"	1,500	1

1/Subject to Fisheries Agency approval.

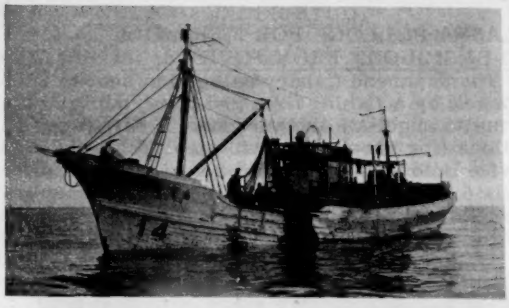


Fig. 1 - Typical small otter trawler fishing in the Bering Sea for a mothership.

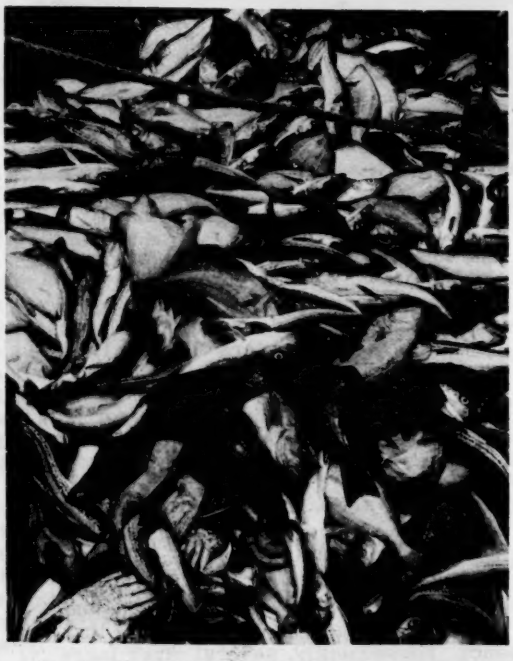


Fig. 2 - Shows Bering Sea catch of a Japanese trawler.

8 large trawlers accompanied by small trawlers. (Suisan Keizai Shimbun, January 13, 1966.)

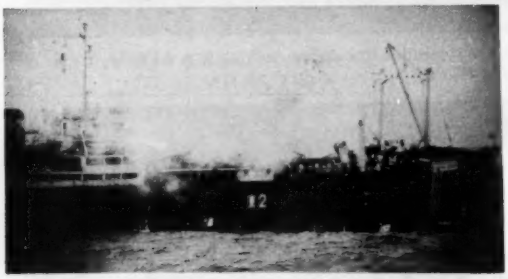
Note: Press reports January 18 indicated that the Central Fisheries Coordination Council (highest Government-industry consultative body) on January 17 approved the operation in the Bering Sea and Gulf of Alaska bottomfish fisheries of 25 mothership fleets, including 216 catcher vessels. The licenses are good until August 31, 1967.

* * * * *

Japan (Contd.):

ALASKA POLLOCK FOR FISH MEAL TO BE BOUGHT FROM SOVIETS:

The Japanese fishery delegation sent to Moscow by a fishing firm and two trading firms to negotiate the purchase of Alaska pollock (for processing into meal) from the Soviet Union has concluded a contract. It calls for the purchase in 1966 of 45,000 metric tons at US$20.50 a ton, $3 above the price paid for Soviet-caught Alaska pollock in 1965.



Hoyo Maru, Japanese fish meal factoryship that is to receive Alaska pollock from trawlers for use in fish meal.

The fishing firm's 14,000-ton fish-meal factoryship Hoyo Maru was scheduled to depart Japan on January 10 for the Okhotsk Sea and to begin receiving deliveries of Alaska pollock from Soviet trawlers January 15. (Suisan Tsushin, January 6 & 10, 1966.)

Editor's Note: According to one report, the purchase was negotiated at a price of $20.30 a ton. Some periodicals in 1965 reported the 1965 price to be $16 a ton, but several more recent articles state the price was $17.50 a ton.

The Hoyo Maru in January-March 1965 received deliveries of about 36,000 tons of pollock from Soviet trawlers. The operation was a success, due in great part to the good demand for meal and the firm price of that product. Subsequently, several other large fishing companies submitted applications to the Fisheries Agency to purchase pollock from the Soviet Union for processing into meal and minced fish meat. This was vigorously opposed by the Hokkaido fishermen and processors. The Agency eventually authorized only the one firm to engage in the fishery and granted that firm an increase in quota to 45,000 tons. However, the firm was authorized to produce fish meal only.

Note: See Commercial Fisheries Review, January 1966 p. 84; December 1965 p. 70.

* * * * *

GOVERNMENT ANNOUNCES FISH MEAL IMPORT ALLOCATION:

The Japanese Ministry of International Trade and Industry (MITI) announced an import allocation of 56,000 metric tons of fish meal for the second six months of fiscal year 1965 (April 1965-March 1966). That is 16,000 tons less than the anticipated import allocation of 72,000 tons, but the reduction in quantity is attributed to a world shortage in fish meal. For FY 1965 fish meal imports authorized by MITI totaled 124,000 metric tons.

Fish meal was quoted on the Japanese domestic market in late November 1965 at an average of $200 a metric ton, but MITI has calculated the importation of the 56,000 metric tons of meal on the basis of $180 per ton c.i.f. (Nihon Suisan Shimbun, November 29, 1965.)

* * * * *

MACKEREL FISHING COMPETITION FROM PURSE-SEINERS CAUSES PROBLEMS FOR POLE-AND-LINE FISHERMEN:

Conflict has developed in the Japanese coastal mackerel fishery between purse-seine and pole-and-line fishermen. Purse-seine vessels of the Japanese Surrounding Net Fishery Adjustment Association of the North Pacific Area have moved into the coastal mackerel fishing grounds in large numbers. The entry of the purse-seine vessels is blamed for a drop in the catch of mackerel by pole-and-line fishermen under the East Japan Mackerel Pole-and-Line Fishery Adjustment Association.

Mackerel landings in Japan by pole-and-line fishermen for 1965 as of December 8, 1965, were 30,401 metric tons valued at US$3.78 million. Compared with 1964, that was a drop of 29 percent in quantity and 21 percent in value. On the other hand, mackerel landings by Japanese purse-seine fishermen in the first 11 months of 1965 were 167,300 tons, valued at $12.87 million, an increase of 112 percent in quantity and 130 percent in value over 1964.

Pole-and-line fishermen of Kanagawa, Shizuoka, and Ehime Prefectures have been hit especially hard by the competition from purse-seine vessels. It has caused a drop in ex-vessel prices as well as a catch decline for the pole-and-line vessels.

Japan (Contd.):

In late 1965, the pole-and-line fishermen presented a petition to the Japanese Fisheries Agency asking that (1) purse-seine fishing be prohibited at night; (2) the purse-seine fishing season be shortened; and (3) the purse-seine fishing grounds be restricted. The purse-seine fishermen oppose such limitations.

The Japanese Fisheries Agency scheduled a meeting between the two groups on December 16, 1965. The Fisheries Agency was expected to mediate the dispute. (Nihon Keizai, December 15, 1965.)

* * * * *

MACKEREL FISHERY OFF TO GOOD START:

The Japanese pole-and-line mackerel fishery, which started January 8 off the Pacific coast of Chiba Prefecture (east of Tokyo), got off to a good start. Catches between 1,300-1,700 metric tons were being landed daily and sold at ex-vessel prices of 40-50 yen a kilogram (US$101-126 a short ton). Mackerel packers were hoping to begin packing around January 20, but were waiting for prices to drop below the 40-yen-per-kilogram level. (Kanzume Nippo, January 18, 1966.)

* * * * *

SAURY CATCH DOWN IN 1965:

The total catch of saury as of December 15, 1965, was estimated at 227,000 metric tons and had already exceeded the 1964 catch of about 200,000 tons. By year's end the catch was expected to total about 240,000 tons, but that quantity is far below the catch of 384,000 tons in 1963 and 483,000 tons in 1962. The landed value of the 1965 catch through December 15 was estimated at 9,200 million yen (US$25.5 million), exceeding by 53 percent 1964's estimated value of 6,000 million yen (US$16.7 million). The large increase in value is attributed to the poor fishing conditions which prevailed during the early part of the season and fear of another poor season, thereby resulting in competition for supplies among such groups as bait and canned food processors. (Suisan Tsushin, December 16, 1965.)

* * * * *

WHALING OPERATION IN NEWFOUNDLAND UNDER STUDY:

A Japanese fishing company is studying a plan to establish a whaling operation in Newfoundland. The Japanese firm, through a trading firm, in December 1965 was conducting negotiations with Canadian interests. In September 1965, that firm chartered a vessel to conduct studies on the whale resources off Newfoundland, but completely reliable results were not obtained because of the shortness of the charter period. (Nihon Suisan Shimbun, December 1, 1965.)

* * * * *

HERRING ROE SHORTAGE PUSHES PRICES TO RECORD HIGH:

There was reported to be a great shortage in Japan in early December 1965 of processed herring roe, which is in great demand during the New Year holiday season. As a result, on December 7, top-quality dried herring roe had been bid up to 22,500 yen per kilogram (US$28.40 a pound) by buyers at the Tokyo Central Market. Top price paid for herring roe in 1964 was 17,000 yen per kilogram ($21.46 a pound), with the average ranging between 12,000-13,000 yen kilogram ($15.15-$16.41 a lb.) Top price paid in 1963 was 16,500 yen a kilogram ($20.80 a lb.). (Suisan Keizai Shimbun, December 9, 1965, and other sources.)

* * * * *

REST HOME FOR FISHERMEN TO BE ESTABLISHED AT LAS PALMAS:

The Japanese Welfare and Health Ministry and the Finance Ministry here agreed to establish at Las Palmas, Canary Islands, a rest home for crew members of Japanese vessels engaged in pelagic fisheries in the Atlantic. The home will be the first such official facility overseas and work on it was scheduled to begin the spring of 1966. A suitable Spanish villa will be remodeled at a cost of 20 million yen (US$56,000). Work is expected to be completed by early 1967.

Las Palmas is a large base for Japanese fisheries in the Atlantic. Almost all major Japanese fishing companies have bases at Las Palmas. On some days more than 1,000 Japanese fishermen go ashore there. It is estimated that over 8,000 Japanese fishermen are engaged in fishing operations from Las Palmas. Many of the fishermen are away

Japan (Contd.):

from home for more than a year. The home will provide a place for recreation and relaxation. (Nihon Keizai, January 13, 1966.)

* * * * *

JAPAN-COMMUNIST CHINA PRIVATE FISHERIES AGREEMENT RENEWED:

Japanese private fishery interests and Communist China, on December 17, 1965, reached accord in Peking to extend for another 2 years the Japan-Communist China Private Fishery Agreement covering fishing operations in the East China Sea and the Yellow Sea, effective December 23, 1965. Agreement was reached following 3 weeks of negotiations.

The areas covered by the agreement are north of 27° N. latitude and east of a line extending approximately 50 miles off the Chinese mainland. In those areas, the agreement provides, among other things, for six fishing zones where a limited number of fishing vessels from both countries may fish, and emergency ports of call for distressed fishing vessels of both countries. In the fall of 1965, Japan was reported to have 760 dragnet vessels and 20 trawlers operating in the area covered by the agreement.

The new agreement calls for a tightening of fishery regulations on mesh sizes, minimum fish size, and catch composition. It also provides for extending eastward regulatory areas 1 and 2 to a distance of 15 miles, mainly for the purpose of protecting shrimp resources. The number of vessels, both Japanese and Chinese, that can operate in the restricted areas remains the same. (The Japan Economic Journal, December 28, 1965; Suisan Tsushin and Suisan Keizai Shimbun, December 20, 1965; and other sources.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 70; Jan. 1965 p. 85; Jan. 1964 p. 61.

* * * * *

FISHERIES AGENCY BUDGET FOR FISCAL YEAR 1966:

The Japanese Cabinet on January 14, 1966, approved a general account budget for fiscal year 1966 (begins April 1) for submission to the Diet (parliament), which convened in late January. Funds requested for the Fisheries Agency, Ministry of Agriculture and Forestry, total 24.2 billion yen (US$67.2 million), an increase of 4.0 billion yen ($11.1 million) or about 20 percent over 1965's regular fishery budget of almost 20.2 billion yen ($56.1 million). The proposed increase in the fishery budget is considerably higher than any past increases approved by the Cabinet.

Proposed funding for some fisheries programs include:

Program	Proposed 1966 Budget		1965 Budget	
	1,000 Yen	US$	1,000 Yen	US$
Improvement of vessel gear and shipboard medical service . . .	38,000	105,556	-	-
Improvement in weather and fishing condition forecasts	29,000	80,556	24,000	66,667
Resource conservation (including water pollution control) . . .	482,000	1,339,000	473,000	1,314,000
Measures to improve marketing of fishery products	351,000	975,000	252,000	700,000
Sea farming development surveys	19,000	52,778	12,000	33,333

New programs in the fiscal year 1966 fishery budget include, among others, extension of a $14,000 government subsidy to improve medical service aboard fishing vessels engaged in high-seas fisheries, $83,000 for installation of labor-saving devices aboard the 602-ton government research vessel Shoyo Maru, and $7,000 for long-line gear research. The proposed budget also includes a large increase in funds for the promotion of frozen fishery products on the Japanese domestic market and a request for additional funds for sea-farm development projects. (Suisan Keizai Shimbun, January 17; Minato Shimbun, January 15, 1966.)

Kenya

FISHERIES PRODUCTION, 1964:

Area of Production or Product	Fisheries Production, 1964		
	Quantity	Ex-Vessel Value	
	Metric Tons	KL	US$1,000
Fish:			
Coast	4,652	248,275	6,952
Lake Victoria .	12,000	672,000	18,816
Lake Baringo .	600	18,120	507
Lake Rudolf .	850	4,760	133
Lake Naivasha .	550	18,480	517
Other Lakes . .	350	19,600	549

(Table continued on next page.)

Kenya (Contd.):

Fisheries Production, 1964 (Contd.)

Area of Production or Product	Quantity	Ex-Vessel Value	
	Metric Tons	KL	US$1,000
Fish ponds . .	120	13,440	376
Rivers	1,000	44,800	1,254
Total	20,122	1,039,475	29,104
Other Marine Products:			
Oyster meats .	2.5	3,353	94
Oyster shell--crushed . . .	100.0	2,500	70
Beche-de-mer (Sea cucumber) (fresh weight)	35.4	752	21
Green turtle . .	5.0	168	5
Spiny lobster (crawfish) . .	52.6	10,245	287
Shrimp (prawn)	27.0	2,500	70
Total	222.5	19,518	547
Grand total .	20,344.5	1,058,993	29,651

Note: One Kenya £ equals US$2.80.

Republic of Korea

TUNA FISHING IN
ATLANTIC AND INDIAN OCEANS
PLANNED FROM AFRICAN BASES:

Korea plans to set up fishing bases (mainly for tuna) at various African coastal ports, according to the Korea Marine Industry Development Corporation. From those African bases, South Korean vessels would be able to fish extensively for the first time in the South Atlantic and Indian Oceans.

To expand fishery exports, Korea has been making large investments in an offshore fishing fleet. An example is the order for 91 fishing vessels (including 76 tuna vessels and some trawlers) placed by Korea with a French-Italian group. In August 1965, it was announced that half of those vessels would be delivered in 1965 and the remainder in 1966.

Under current proposals, Korea will begin a massive buildup of her fishing fleet with funds provided by Japan under the normalization agreement between the two countries. Some of the funds will also be used to develop Korean processing and canning plants.

Fishery and marine product exports with a total value of US$29.3 million was South Korea's target in 1965. (United States Embassy, Seoul, December 27, 1965.)

Morocco

CANNERS COMPLAIN
ABOUT EXPORT CONTROLS:

Canned fish was among the products placed under the control of the Office de Commercialisation et d'Exportation (OCE) by the July 1965 decrees nationalizating Moroccan exports of food products and handicrafts. Implementing the nationalization of the exports of the canning industry (which in 1964 exported $26.8 million in canned fish, $4.2 million in canned fruits and vegetables, and $3.2 million in canned fruit and vegetable juices) appeared to be less complicated because of the nonperishable nature of the product, the control exercised over the industry by the OCE's predecessor (the Office Cherifien de Control d'Exportation), and the organization of the industry in canners associations. However, in a late 1965 meeting of the Conseil Superieur de la Conserve, the members decided to send a memorandum of their grievances against the OCE to the various ministers who serve on the governing council of that organization. According to the newspaper, Maroc Informations, the memorandum made the following points:

(1) The new expenses imposed on the producers despite their protests add to production costs already too high.

(2) Despite the good intentions of the responsible officials, the administrative regulations which govern the organization do not permit it the flexibility required in commerce or the speed necessary in export operations. For these reasons numerous claims by purchasers are made daily.

(3) The lack of technical knowledge in certain branches (of the OCE) or the lack of experience results in serious mistakes which harm the foreign customers as well as the canners and damages the good commercial reputation of the Moroccan industry.

(4) The uncertainty of obtaining a normal profit margin in the canning industry not only will prevent its expansion but will risk checking investments required for modernization already undertaken.

While the situation outlined in the memorandum is perhaps due in part to the initial confusion and administrative problems involved in hurriedly setting up a new organization, the Moroccan canning industry, particularly the fish canners, have been in a

Morocco (Contd.):

precarious state for some years. The additional production costs caused by the OCE have only added to the problems of the fish canners.

According to the weekly, La Vie Economique, the average cost price of packed sardines which make up about 80 percent of the Moroccan canned fish exports is higher than the average world market price. This is brought about by the fact that the price of the fresh fish to the canners is set by the Government on the basis of a fair return to the vessel owners who operate old inefficient boats with excess labor. Labor costs on the fishing vessels and in the canneries are high because of union pressure, which is supported by the Government, to keep employment at maximum levels.

The portion of the sardine pack which is sold at world market prices is thus sold at a net loss to the industry. This loss, however, is more than made up by the sale of an annual duty-free quota to France at the high price of the protected French internal market. Most of the industry is dependent on this French quota which is renewed annually. The quota could, however, be abolished or drastically reduced at any time.

In 1966, the price squeeze on the fish canners is even greater than before since other costs, including the price of cans and the oils used in packing the fish, have risen. In addition, the OCE receives the equivalent of 60 U.S. cents per case of canned fish exported to France and 20 U.S. cents per case on exports to other countries. As a result of these increased costs and delays caused by the newness of the OCE, the latest available statistics show that canned fish exports dropped 36 percent during July-September 1965 as compared to the same period in 1964. According to the OCE's statistics, exports of canned fish during the summer quarter were lower than in any of the past nine years. (United States Embassy, Rabat, Morocco, January 5, 1966.)

New Zealand

JAPAN SEEKS FISHING RIGHTS WITHIN NEW ZEALAND 12-MILE FISHING LIMIT:

The Japanese Government on December 20, 1965, sent a 3-man delegation to New Zealand to seek recognition of Japanese fishing rights within New Zealand's 12-mile fishing limit, which became effective January 1, 1966. About 25 Japanese bottomfish longline vessels have been fishing for sea bream within 12 miles of New Zealand's coast, and Japanese trawlers have also been operating in adjacent waters since 1960. Japan's position is that she does not recognize any exclusive fishing zone established unilaterally and without arrangements being made with affected countries. However, according to preliminary reports the New Zealand Government has stated that within its 12-mile limits it will not recognize Japanese fishing activities beyond a prescribed time limit. (Suisan Tsushin, December 28, 1965, and Suisan Keizai Shimbun, December 21, 1965.)

* * * * *

TWELVE-MILE FISHING ZONE CLAIM DISCUSSED WITH JAPAN:

Representatives of the Japanese and New Zealand Government discussed in early January 1966 the question of New Zealand's twelve-mile fishing zone. This zone was established by New Zealand legislation enacted on September 10, 1965, and took effect January 1, 1966. Japanese Government representatives stated that they were unable to recognize the validity of the New Zealand zone in terms of Japan's understanding of international law on such questions. New Zealand representatives reaffirmed New Zealand's view that it is within the sole competence of the coastal state.

The Japanese indicated that they intend to refer the matter to the International Court of Justice in order to resolve the difference of opinion on the the international legal issue. They suggested that this might be done jointly by both governments. It was the New Zealand Government's understanding that the Japanese Government would, as a next step, submit detailed proposals for stating jointly a case to the court. Meantime, provision has been made for continuing consultations through diplomatic channels on the interim situation in order to ensure that the merits of either party's legal position should not be prejudiced and

New Zealand (Contd.):

that the overall friendly relations between the two countries should be preserved. (United States Embassy, Wellington, January 7, 1966.)

Nigeria

SHRIMP FISHERY TRENDS, LATE 1965:

The shrimp resource off Nigeria has attracted a lot of interest. Following is a short summary of recent development projects in this potential fishery:

In the spring of 1964, a trawler working off Nigeria was supplied shrimp trawls (Gulf of Mexico-type) through the cooperative efforts of the U. S. Agency for International Development (AID) and the Food and Agriculture Organization (FAO). The results proved more than satisfactory. The vessel which had been landing from 50 to 100 pounds of heads-on shrimp after a 3-day trip started landing from 1,000 to as high as 2,400 pounds of shrimp in the same length of time at sea. As a result of those catches, shrimp shipments totaling 6,426 pounds were sent to the United States market to test its acceptance. The shrimp was handled through regular trade channels and proved quite acceptable as to taste and appearance. Most of the shrimp caught off Nigeria are of the Penaeus duorarum species and correspond to Gulf of Mexico pink shrimp, according to marine biologists. There have been several types of shrimp trawls used off Nigeria since the initial trials and all have been successful.

Most of the shrimp fishing done during the initial explorations in 1964 was in 12 to 20 fathoms outside of Lagos Harbor, some 20 miles in either direction. Since then the United States trawler Basra, which arrived in January 1965, has found richer shrimp grounds in the delta area off Port Harcourt. Catch rates were as high as 1,500 pounds of heads-off shrimp a night. During the limited explorations from April 1964 to December 1965, there was no appreciable seasonal change in production, but more intensive fishing might reveal a seasonal pattern.

Since the first large catch of shrimp off Nigeria in April 1964, U. S. commercial firms have shown a growing interest in the fishery.

One U. S. firm sent two American shrimp trawlers to explore for shrimp off Nigeria in January 1965. That company plans a shrimp fishing operation off Nigeria in which the catch would be processed at sea aboard freezer trawlers.

Two other U. S. firms were given AID survey grants to study the Nigerian shrimp grounds, and their representatives arrived in the early months of 1965. One of those groups returned in October 1965 to make final arrangements for a joint U. S.-Nigerian company to be located in the Port Harcourt area starting with a nucleus of 10 shrimp trawlers.

Still another large shrimp producer from Tampa, Fla., arrived in October 1965 and spent some time surveying the various Nigerian ports and facilities. The reaction was favorable, and it is expected that an operation by this group will be started soon.

In addition, AID is going ahead with plans to help Nigerians develop a local trawler fleet. Several technicians for the AID project have already been assigned. (United States Embassy, Lagos, December 21, 1965.)

Norway

EXPORTS OF FISHERY PRODUCTS AT RECORD LEVEL IN 1965:

Norwegian exports of fishery products in 1965 had a record high value of about US$200 million. Production of frozen fishery products and fish meal were up substantially in 1965. Norwegian landings in 1965 totaled more than 2.1 million tons as compared to 1.4 million tons in 1964. Very large catches of herring in the North Sea throughout the second half of 1965 accounted for much of the increase.

Compared with 1964, the export increases in 1965 for the main categories of Norwegian fish products were as follows: fresh, frozen, dried, salted, and smoked fish--23 percent; herring meal--38 percent; other fish meal--31 percent; and hardened fats--18 percent. (The Export Council of Norway, January 1966.)

* * * * *

EX-VESSEL PRICES FOR INDUSTRIAL FISH IN 1966:

Ex-vessel prices in 1966 for reduction fish (herring and other species) have been agreed

Norway (Contd.):

upon in Norway by representatives of the fishermen and the fish meal and oil industry.

Norwegian Ex-Vessel Prices for Reduction Fish, 1965-1966

Species	1966	1965
	(US$ Per Short Ton)	
Fat herring	1/	2/
Winter herring (storsild)	36.66	29.77
Winter herring (vaarsild)	30.59	26.63
North Sea herring	45.40	40.15
Capelin	16.70	12.77
Sandeel	27.31	23.18
Norway pout	25.53	21.46
Mackerel, Jan. 1-Aug. 15	42.16	35.22
Mackerel, Aug. 16-Dec. 31	40.26	

1/The 1966 prices for fat herring will, as a change from 1965, be based partly on the fat content of the fish. The basic price in price group I (1-3 herring per kilogram) is set at US$19.94 per short ton, and in price group II (more than 3 herring per kilogram) at $18.77 per ton. For each percent of fat exceeding 2.7 percent there will be an additional payment of $1.52 a ton.

2/Prices not available.

Note: Prices above were originally announced in Norwegian kroner per hectoliter. The prices in dollars per short ton were arrived at by the use of official Norwegian conversion factors (1 krone equals 14 U.S. cents).

The 1966 ex-vessel prices are higher than in 1965.

The year 1965 was a record year for the Norwegian fish meal and oil producers in terms of production as well as sales. In January-October 1965, total deliveries of herring and other fish to the reduction plants reached 1.5 million short tons, or 85 percent more than in 1964. The increase was largely accounted for by record catches of North Sea herring and capelin.

According to official Norwegian trade statistics, 206,900 short tons of herring meal valued at Kr. 235 million (US$32.9 million) were exported in January-October 1965, or about one-third more in terms of quantity and two-thirds more in terms of value than in 1964. (United States Embassy, Oslo, January 9, 1966.)

* * * * *

CANNED FISH EXPORT TRENDS, JANUARY 1-OCTOBER 9, 1965, WITH COMPARISONS:

Exports of the principal Norwegian canned fish export items (brisling, small sild, and kippered herring) were about the same during the first three quarters of both 1964 and 1965. But in 1965 stocks were down and fishing for brisling and small sild was disappointing.

During January 1-October 9, 1965, exports of the principal items in standard cases (100 $\frac{1}{4}$ cans) were as follows (comparable 1964 data in parentheses): brisling 311,000 cases (307,000 cases), small sild 640,000 cases (645,000 cases), and kippered herring 206,000 cases (201,000 cases).

During January 1-August 31, 1965, exports of canned crab were 497 metric tons (446 tons in 1964) and exports of canned shrimp were 312 tons (613 tons in 1964).

Pack of canned brisling during January 1-October 9, 1965, was 356,000 standard cases (no change from 1964) and that of small sild was 427,000 standard cases (down 17 percent from 1964).

Stocks of brisling and small sild were short in late 1965. Increasing sales of Norwegian canned brisling over the last several years have cut into carryover stocks, and the 1965 pack of brisling (although about the same as in 1964) failed to meet demand. The brisling fishing season closed October 15, 1965; however, canners continued to pack brisling from frozen stocks. The small sild fishing season was expected to continue until January 31, 1966, and packers were hoping for some improvement in fishing during the latter part of the season.

The United States was the principal market for Norwegian canned fish exports in the first 8 months of 1965 taking 7,017 tons valued at Kr. 39 million (US$5.4 million), a gain of 8 percent in quantity and 10 percent in value over the same period of 1964. Other important markets for Norwegian canned fish are Great Britain, continental European countries, South Africa, Canada, and Australia. (Norwegian Canners Export Journal, October and November 1965.)

* * * * *

COST OF TYPICAL NEW HERRING PURSE SEINER:

Norway's productive North Sea herring fishery has encouraged the construction of many new purse seiners. A typical new Norwegian steel seiner (length 125 feet, breadth 26.5 feet, and depth 13.5 feet with an 800-horsepower diesel engine, sonar, echo-sounder, radar, direction-finder, radiotelephone, winch, and power block) costs about US$280,000. A towboat and seine skiff with echo-sounder costs $9,100; two seines cost $56,000, and a

Norway (Contd.):

fish pump $11,200. (Dansk Fiskeritidende, December 17, 1965.)

* * * * *

LONG-LINE BAITING MACHINE DEVELOPED:

A small baiting machine for long-line fishing has been developed by a firm in Stavanger, West Norway, in cooperation with the Chemical-Technical Research Institute of the Norwegian Directorate of Fisheries. Before baiting, the line is coiled up in the machine, and the hooks put into magazines containing 200 each. When the line runs into the water, fish for bait is fed into the machine, and pieces are automatically attached to the hooks as they pass by. Two hooks are baited every second. This allows a vessel to maintain a speed of 6 knots while playing out the long line.

The machine, based on a patented device invented by a fisherman, is said to be of a very simple design which is suitable for all kinds of fishing vessels. (Export Council of Norway.)

* * * * *

FLOATING PLASTIC FISH CONTAINER TESTED:

Floating plastic fish containers for use by herring fishing vessels to add to their holding capacity (by 46 to 183 metric tons) are being tested by the Central Institute for Industrial Research at Oslo, Norway.

A 46-ton container, which is described as sausage-like, occupies less space than a life raft. If the catch exceeds the carrying capacity of the vessel, the container can be launched filled with fish, kept afloat with compressed air, and towed to the landing place. The first experimental container tested has a capacity for 500 hectoliters (46.2 metric tons) of herring or similar bulk fish. A similar container capable of carrying 2,000 hectoliters (183 metric tons) will also be tested.

If expectations are fulfilled, one of the problems arising during heavy herring fishing off Norway should be solved, as fishermen will be able to make use of excess catches or keep fishing beyond their present limitations.

The 2,000-hectoliter container is to be fitted with a radar reflector or radio beacon, which will direct tugs or transport vessels to the spot where the containers were released after having been filled from the fishing vessels. The tugs might be needed to tow the larger containers because some skepticism has been expressed as to the chances of bringing in a fully loaded purse-seine vessel safely when towing a fully loaded container under rough weather conditions. (World Fishing, December 1965.)

Pakistan

CHINESE TO INCLUDE FISHERY PRODUCTS IN TRADE FAIR:

Chinese Communists plan a "giant trade fair" in mid-March at Karachi, Pakistan. Fishery products will be among the 4,000 items on display. (U. S. Embassy, Karachi, January 14, 1966.)

Persian Gulf

SHRIMP FLEET BUILT IN NORWAY ARRIVES IN PERSIAN GULF:

A complete shrimp fleet, comprising a 177-foot mothership, eight 89-foot trawlers, and a 39-foot exploratory stern trawler, began operating in the Arabian Gulf in late 1965 after an armada-style voyage from Bergen, Norway, to Kuwait.

All eight trawlers in the fleet are fitted with freezing equipment. The mothership, christened the Marzook, supplies them with fuel, water, etc., takes on their frozen catches, and cooks and freezes some of the shrimp in a blast freezer with a capacity of 4 tons in 24 hours. The catches are then loaded aboard a cargo vessel for shipment to foreign markets, mainly in Great Britain and the United States. (Simrad Echo, January 14, 1966.)

Peru

LIBERALIZES LICENSE PERIOD FOR FOREIGN-FLAG FISHING VESSELS:

Supreme Decree No. 16, dated December 28, 1965, liberalizes the period of license

Peru (Contd.):

validity for foreign-flag vessels fishing for Peruvian companies. Under the terms of the decree, licenses for such vessels will be valid to the end of the calendar year in which they are purchased. (U. S. Embassy, Lima, January 6, 1966.)

Philippines

BUY SOUTH AFRICAN CANNED FISH:

Under a purchase agreement concluded at the end of the season, some 70,000 cases of canned sardines had been shipped to the Philippines. According to the Namib Times, the Philippine National Marketing Corporation (NAMARCO) wished to buy considerably more, but the South-West African end-of-season supplies were inadequate. Large orders are expected during the coming season. The periodical speculates that the recent change of Government in the Philippines is unlikely to affect South-West African fish sales to that country as the fish are highly competitive in terms of price and quality.

This is the second large purchase of fish by the Philippines since announcement of a ban on imports from South Africa. In April 1964, the Philippines purchased 875,000 cases. (United States Consulate, Cape Town, December 17, 1965.)

Poland

ATLANTIC TUNA FISHERY NOT PLANNED:

Poland does not now fish for tuna and has only taken a few tuna incidentally while catching other fish. Initiation of tuna fishing, including construction of tuna vessels, was considered during development of the new 5-year fisheries plan

Japanese long-lining techniques and power-block purse-seining were reviewed but both would require learning complex new techniques. At least one Polish fisheries expert considered the labor involved in long-lining unsuited to Polish fishermen. Furthermore, an effort to send a Pole to Japan through FAO to learn long-lining was cancelled by Japanese industry opposition.

Special tuna vessels would have to be constructed. At present there is no tuna vessel building program nor is there one included in the new 5-Year Plan. However, a latent Polish interest in tuna fishing remains. (U. S. Embassy, Warsaw, January 22, 1966.)

Editor's Note: There have been incidental catches of tuna while fishing for herring in the North Sea and possibly off Africa. The Polish state fishery enterprise "Arka" sent a cutter to fish with poles and lines for tuna in the Bay of Biscay in 1960 with unsatisfactory results. Canned tuna available in Poland is mostly imported from Yugoslavia and is not a significant item in domestic fish consumption. The staff of the Sea Fisheries Institute, Gdynia, did much of the background investigation for the tuna project proposed for the new 5-Year Plan.

* * * * *

CONSTRUCTION AND EXPORT OF FISHING VESSELS:

Polish shipyards built the first vessels for export in 1952. They were conventional B-10 class steam trawlers destined for Soviet owners, each of 450 tons deadweight. Five years later they were replaced by an improved B-14 series, of which 46 units were built by 1961. The heavy and spacious steam engine of the B-10 was replaced in the B-14 by a much smaller diesel engine.

The building of the first factory trawlers and stern trawlers was also undertaken. Polish shipyards have mastered the serial production of large base ships serving as floating warehouses, and workshops as well as the construction of processing factoryships operating with fishing flotillas far away from home ports.

Two Polish shipyards have specialized in the building of fishing vessels. Fishing vessels built in Polish shipyards can be seen more and more frequently in nearly all of the world's fishing grounds. They operate in tropical oceans near African coasts, in the North Atlantic, and in the Caribbean Sea.

According to statistics published by British sources (Lloyd's Register), Poland ranks second in the world for fishing vessel tonnage built, with Japan first. A noticeable percentage of the Polish-built fishing vessels are exported.

Poland (Contd.):

The Import and Export Office for Ships and Marine Equipment (CENTROMOR) of Warsaw has sold 173 vessels over the past 15 years to foreign customers. For several years French owners from the Atlantic ports of Boulogne-sur-Mer, Lorient, and La Rochelle have been regular clients of Polish shipyards, which have built for them B-20, B-21, and B-27 class motor trawlers. (Polish Maritime News, November 1965.)

Rumania

DISCONTINUES FISHING IN THE NORTHWEST ATLANTIC:

The large stern trawler Galati came into the port of Casablanca, Morocco, for supplies. The Galati and her sistership Constanta were fishing off the United States Atlantic coast the latter part of 1965. The Galati reportedly caught 500 metric tons of herring as well as some cod while operating on Georges Bank in the Northwest Atlantic. Early in 1966 the Galati was fishing off Morocco's southern coast for mackerel and allied species. (La Peche Maritime, November 1965, p. 841.)

Editor's Note: In January 1966, both of the large freezer stern trawlers, owned by the Rumanian Government, began fishing off western Africa. Both Rumanian trawlers also fished off Africa's west coast between the Tropic of Cancer and the Equator in the spring of 1965. One of them, the Constanta, caught about 2,000 metric tons of fish in one 5-month-long trip and produced 860 tons of edible fishery products and 200 tons of fish meal. In previous trips, the two Rumanian stern trawlers fished near the Faeroe Islands and in the Pacific.

Note: See Commercial Fisheries Review, April 1965 p. 82; July 1964 p. 55; March 1964 p. 67.

South Africa Republic

MUCH OF 1966 FISH MEAL OUTPUT SOLD IN ADVANCE FOR HIGHER PRICES:

About 60 percent of expected 1966 fish meal output in the South Africa Republic was sold in advance at prices at least 25 percent above those in 1965, according to an official in the South African industry. He said that the high prices in the world market were due to uncertainties in the Peruvian outlook. (Namib Times, December 24, 1965.)

South-West Africa

WHITE FISH INDUSTRY EXPANSION:

Possibly in response to the rapidly increasing foreign interest in South-West Africa's white fish resources, several South or South-West African companies have indicated plans for exploiting the resource through facilities planned or under construction at Walvis Bay. An article in the Namib Times of November 26, 1965, indicated that among the planned investments in Walvis Bay are: (1) a white fish factory valued at more than US$4.2 million to be constructed by the Marine Products group; (2) a fish and meat freezing plant to be constructed by a South African company which is already doing experimental trawling off the coast; and (3) construction of a $350,000 white fish factory by Atlantic Rock Lobster Bpk., subject to the Administration's approval of certain arrangements. According to the article, Atlantic Rock Lobster is seeking permission to use three foreign trawlers with crews to fish for the company. It has also obtained the participation of British interests who will help with technical staff, construction and operation of the factory, the supply of modern machinery, and marketing. Finally, the article noted that an $85,000 white fish and snoek processing factory owned by Tafelberg Fisheries is already under construction in Walvis Bay. The Walvis Bay Town Council has set aside a number of additional plots of sea frontage for fish-processing factories, indicating that further interest may have been expressed by other South African firms. (United States Consulate, Cape Town, Dec. 17, 1965.)

* * * * *

VESSEL OWNERS SEEK TO RESTRICT FOREIGN FISHING VESSELS:

In a letter to the Administrator of South-West Africa, the Walvis Bay Boat Owners' Association has suggested that restrictions be applied to foreign trawling operations off the South-West African coast, in order to prevent overfishing beyond the territory's 12-mile fishing limit. Among the suggestions incorporated in the letter were: (1) prevent-

South-West Africa (Contd.):

ing the transshipment of fish by foreign trawlers calling at Walvis Bay; and (2) denying fresh provisions and water at Walvis Bay. The letter culminates a press and public attack on the growing incursions of foreign fishing vessels in the waters off South-West Africa. Although the vast majority of the vessels are believed to fish only white fish, the boat owners' concern seems to center around possible depletion of the pilchard stocks through disruption of their breeding grounds, which lie fairly close to the 12-mile fishing limit. A representative of the South African fishing industry, commenting on the Association's proposals, tended to dismiss them as impractical and ineffective.

According to the periodical Cape Argus (Cape Town, S. Africa) of November 13, 1965, Walvis Bay has become a supply station for fishing vessels from a number of other countries. In addition, crew members of many of the vessels spend considerable sums of money in Walvis Bay for personal needs. Among the nations represented are: Belgium, Israel, Spain, Japan, U.S.S.R., Bulgaria, and Poland. Soviet, Bulgarian, and Polish vessels have been discouraged from visits to Walvis Bay and their frequency of stops had decreased noticeably in late 1965. (United States Consulate, Cape Town, December 17, 1965.)

Thailand

JAPANESE SET UP JOINT SHRIMP ENTERPRISE IN THAILAND:

A Japanese fishing firm and a Thai trading company have agreed to establish a joint shrimp-processing company in Thailand. The Japanese firm will provide technical assistance in the freezing and processing of shrimp and will purchase the frozen shrimp produced by the joint company for export to Japan. It was reported that the Japanese firm hopes to purchases 300-400 metric tons of frozen shrimp a year. The proposed venture was scheduled to begin operations in February 1966. (Suisan Keizai Shimbun, January 17, 1966.)

Tristan da Cunha

TRISTAN DA CUNHA SPINY LOBSTER FISHERY, LATE 1965:

A spiny lobster fishing project and a new harbor should bring important changes to the tiny island of Tristan da Cunha in the mid-South Atlantic where about 260 people live. Many of the islanders are fishermen, but they have been able to push their small dinghies off the rocky beach through the heavy surf only about 40 days a year. The new harbor will extend their fishing season.

The harbor is being provided by the British Government at a cost of about R160,000 (US$222,000) and should be ready for use about April 1966. Sited on the reef in front of the settlement, the small harbor comprises 2 curving arms, each 60 feet wide at the base, which are 270 feet apart at their shore ends and reach to within 50 feet of each other at the entrance. A depth of water of 9 feet has been provided by blasting out solid rock.

The harbor has made possible a new shore based processing and freezing plant at Tristan, which is being financed by interests in the South Africa Republic. Construction of the new plant had begun in late 1965.

In addition to the shore-based operation, the South African fishing vessels Tristania and Gillian Gaggins are expected to operate offshore from Tristan da Cunha during the main fishing season from September to April, after which they will return their catches to South Africa. (The South African Shipping News and Fishing Industry Review, November 1965.)

Tunisia

YUGOSLAVIA TO CONSTRUCT FISHING PORTS:

A Belgrade construction enterprise, the "Ivan Milutinovic," has contracted with the Tunisian Government for feasibility studies on the construction of two fishing ports. The projected fishing ports will be located in the cities of Sukrin and Sayade on the Mediterranean. (U. S. Embassy, Belgrade, November 16, 1965.)

Editor's Note: In 1962, the Yugoslav Shipyards of Pula delivered five tuna fishing vessels to Tunisia, and they are at present building a series of 10 deep-sea fishing vessels.

Tunisia (Contd.):

In August 1964, the Tunisian state-owned fishing corporation, L'Office National des Pêches, concluded an agreement with the East German Rosslau Shipyards for the construction of 10 steel trawlers to be delivered by the end of 1965.

U.S.S.R.

PACIFIC OCEAN PERCH LANDINGS:

Over the past 7 years, Kamchatka fishermen have intensified fishing for ocean perch in the North Pacific and the Bering Sea. In 1959, over 50 percent of Kamchatka's annual catch consisted of flounders; by 1965, ocean perch landings amounted to about 50 percent and flounders only to 8 percent of the total. Kamchatka's herring landings amount to about 50,000 metric tons a year (Kamchatskaia Pravda, January 13, 1966.)

Editor's Note: In 1965, Kamchatka fishermen caught a total of 416,000 metric tons of fish. Ocean perch landings in 1965 were thus in excess of 200,000 metric tons; that species was caught mainly off the Aleutians (with large factory stern trawlers) and in the Gulf of Alaska (with medium and large trawlers). Total 1965 Soviet landings of Pacific ocean perch are estimated at over 400,000 metric tons. Kamchatka fishermen catch flounders mainly in the Bering Sea (off Pribilof Islands); herring is also caught there but even more in the Sea of Okhotsk.

* * * * *

FLOUNDER EXPLORATIONS IN BRISTOL BAY:

In mid-January 1966, one factory stern trawler (Valerii Bykovskii) and 2 medium trawlers (Krutogorovo and Kekurnii) explored for flounders on the outer Bristol Bay flats north of Unimak Island.

* * * * *

ESTONIAN FISHERMEN TO FISH OFF ICELAND:

Fishery Administrators of the Estonian Soviet Republic are studying the possibility of fisheries expansion into Icelandic waters. A small fishing fleet was about to sail the latter part of 1965 to this new area which, according to the Soviets, has not been sufficiently exploited by her fishermen. If the initial exploratory expedition is successful, a larger Estonian fleet will continue to fish on Icelandic banks. As a result, the Estonian fishing operations off the coasts of North America (Georges Bank and Newfoundland) may diminish.

* * * * *

POLAND TO BUILD SOVIET OCEANOGRAPHIC RESEARCH VESSELS:

Polish shipyards at Szczecin will construct nine oceanographic research vessels for the Main Institute of Hydrometeorology of the U.S.S.R. The construction will begin in 1967; at present Polish naval architects are working on the design of the prototype. (Zycie Gospodarcze, December 5, 1965.)

Editor's Note: The new Soviet class of oceanographic research vessels will have these specifications: displacement of 3,550 tons, length exceeding 100 meters (328 feet), a crew of 105 (50 scientists and 55 crew members), and sea endurance of 90 days. This class will be equipped with the latest electronic instruments and will have 23 laboratories as well as auxiliary installations and workshops. The vessels will have reinforced hulls and air-conditioning, enabling them to conduct research both in polar and tropical regions. The range of studies will include hydrology, biology, chemistry, geography, acoustics, and other sciences.

* * * * *

FISHERY AID TO INDIA:

A three-man team from the Soviet Union arrived in India the latter part of 1965 to study the possibilities of extending technical assistance in the development of Indian marine fisheries. The Soviet team began its studies at Visakhapatnam in the Indian state of Hyderabad, adjacent to the Bay of Bengal. This is the first instance of Soviet fishery aid to India. (U. S. Embassy, New Delhi, November 16, 1965.)

Editor's Note: The Soviet Union began its fishery operations in the Indian Ocean 2 or 3 years ago, and ever since has been on the outlook for possible fishery bases to supply her fleets as well as for marketing outlets for her catches. The process seems to be similar to the one that the Soviets have successfully completed in Africa where, after a few initial years

U.S.S.R. (Contd.):

of independent operations, they have finally concluded trade agreements with coastal African countries delivering fresh and frozen fish for local domestic markets.

* * * * *

HERRING SALES TO SCOTLAND:

Scottish kippering firms, unable to obtain supplies domestically, bought 300 metric tons of frozen herring from the Soviet Union in 1965. Additional amounts were purchased from Norway. Soviet-caught fish arrived at Aberdeen in the refrigerated fish transport Zelenogorsk at the end of November 1965. The Scottish purchaser stated that Scottish boats had failed to keep his plants supplied adequately since May of 1965, therefore, the plants operated only by purchasing foreign fish. Soviet-delivered fish was caught in the fall of 1965 off the Hebrides. (The Fishing News, November 26, 1965.)

* * * * *

ANTARCTIC WHALING SEASON, 1965/66:

As in previous years, the Soviet Union is operating four whale factoryships in the Antarctic during the 1965/66 whaling season. Two (Sovetskaia Ukraina and Slava) came from the Soviet Black Sea port of Odessa; one (Iurii Dolgorukii) from the Soviet fishing port of Kaliningrad; and one (Sovetskaia Rossia) from the Far Eastern port of Vladivostok. Because of the smaller Antarctic quota of 4,500 blue-whale units for this season, one of the Soviet whale factoryships will hunt only sperm whales, which are not included in the Antarctic quota agreement. (The Fishing News, November 1965.)

Editor's Note: The Soviets have selected the oldest and least efficient whaling factoryship Slava to hunt sperm whales. The Slava was constructed in 1929 in Great Britain for German whaling interests. She was acquired by the Soviets, and began fishing in Antarctica in 1946.

* * * * *

LIMIT ON SEALING OPERATIONS:

On the recommendation of scientists of the Research Laboratory for Marine Mammals of the All-Union Institute of Fisheries and Oceanography (VNIRO), the Soviet Fisheries Ministry ordered the discontinuation of seal hunting in the White and the Barents Seas during 1966-1970. The reason for this measure was the decreasing size of seal herds in those areas.

Editor's Note: At the 8th Session of the U.S.S.R.-Norwegian Commission for Sea Mammals, December 1965 in Oslo, the Soviets also asked the Norwegians to restrict their seal hunting operations in the Barents and White Seas.

United Kingdom

FREEZER-TRAWLER FISHERY TRENDS, NOVEMBER 1965:

In late November 1965, the British 1,750-ton stern-trawler Victory landed a record catch of about 550 long tons of frozen fish at Grimsby. The fish were caught during a 39-day trip to Newfoundland fishing grounds. Over 500 tons of the catch, which was frozen aboard ship in 100-pound blocks and stowed at -20° F., consisted of cod and codling. Most of the catch was frozen heads-on. Similar catches had been landed during other trips by British freezer trawlers.

The Victory is operated by a firm which markets frozen fish on a nationwide basis, and they recently introduced cod in portion form. The skinless and boneless 3-ounce portions are packed in 14-pound cartons. (Fish Trades Gazette, November 27, 1965.)

* * * * *

DANISH POND TROUT PROMOTED IN GREAT BRITAIN:

A promotional campaign to introduce fresh rainbow trout from Denmark to British consumers is being carried out by a London distributor. Danish trout farms are shipping iced trout (either round or gutted) to selected British wholesalers. The trout are shipped on the same day they are taken live from rearing ponds in Denmark.

Speaking in November 1965, the managing director of the London firm handling the promotional campaign said: "The consumption of trout in Britain at the moment is approximately one fish per head of population per annum. This is a figure that can easily be doubled because of the quality of trout and the fact that it now sells at half the price of a dover sole

United Kingdom (Contd.):

and often almost as cheaply as a herring. Trout is 6d. (7 U.S. cents) a pound cheaper today than a year ago, and I can think of no other wet fish of which this can be said."

The belief that the average family is now more adventurous in its eating habits and will experiment with trout if guided on how it can be used to make interesting meals is the main reason for the promotion. Three-color rainbow trout recipe leaflets have been made available to British retailers. In fact, a number of recipe leaflets are sent with the boxes of trout for retailers to distribute to purchasers. The leaflets are plastic wrapped for protection in transit. (Fish Trades Gazette, November 27, 1965.)

Yugoslavia

FISHING INDUSTRY IN CRISIS:

Because of (1) recent economic reforms which abolished many subsidies to the Yugoslav fishing industry and (2) increased import duties, the planned development of Yugoslav fisheries is being jeopardized. To increase productivity and obtain the concentration of investment funds, a merger of a number of smaller enterprises into large state-owned fishing corporations is planned (3 of these will fish in the Adriatic, 1 on the high seas). In addition, a Government development plan of 43 billion dinars (US$38.5 million) is being prepared for the decade 1966-1975. Some of the funds sought will be received from the Government (mostly made up of annual payments by Italy for the use of the Yugoslav side of the Adriatic Sea), and the balance from domestic and foreign banks. (Morsko Ribarstvo, vol. 17, no. 10.)

* * * * *

INCREASED TUNA CATCHES PLANNED:

The 5-Year Plan (1966-1970), provides for an annual tuna catch of 40,000 metric tons by 1970. All of it will be processed and exported (Morsko Ribarstvo, vol. 17, no. 10).

Editor's Note: In 1964, Yugoslavs caught only 300 tons of bluefin tuna, Plan for 1970 is based on expansion of the Yugoslav Atlantic tuna fleet; three tuna vessels are now under construction at Pula Shipyards.

FISHING VESSEL BUILDERS ADVISED TO STUDY MERCHANT MARINE PRACTICES

The builders of fishing vessels could learn much from studying modern commercial vessels, a Swedish editor told the opening session of the Food and Agriculture Organization's third International Technical Meeting on Fishing Boats, which was held in Goteborg, Sweden, October 23-29, 1965.

The editor, who was formerly a captain of merchant ships, said: "The merchant ships of today are more efficient and cheaper than their predecessors, which means a higher earning capacity. It seems rather odd that--with a few exceptions--similar progress has not been made in fishing boat construction." He named maintenance, rust protection, engineroom layout, the selection of engineroom equipment, economy and management, and automation, as fields in which the fishing industry could learn a great deal from present merchant marine practices.

"Even if the background differs from place to place and from time to time," he said, "the owner of a small merchant vessel and the owner of a fishing vessel have this in common: They operate vessels under severe weather conditions, they have as small crews as possible, and time is always inadequate."

FEDERAL ACTIONS

Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Robert D. McKean, 2056 Encinal Avenue, Alameda, Calif., for the purchase of a used 42.5-foot registered length wood trolling vessel to engage in the fishery for salmon and albacore tuna. Notice of the application was published by the U. S. Bureau of Commercial Fisheries in the Federal Register, January 20, 1966.

Paul C. Smith, 540 South East 4th St., Newport, Oreg. 97365, for the construction of a new 50-foot steel vessel to engage in the fishery for salmon, crab, shrimp, and tuna. Notice of the application was published in the Federal Register, January 25, 1966.

Wayne A. Murphy, Box 331, Homer, Alaska, 99603, and Charles H. Nims, Box 701, Kodiak, Alaska 99615, for the purchase of a new 58-foot steel vessel to engage in the fishery for king crab and salmon. Notice of the application was published in the Federal Register, January 29, 1966.

Lee G. Andrich, Box 1563, Kodiak, Alaska 99615, for the purchase of a used 96.7-foot registered length wood vessel to engage in the fishery for king crab. Notice of the application was published in the Federal Register, January 29, 1966.

Edsel J. Williams, P. O. Box 1318, Homer, Alaska 99603, for the construction of a new 32-foot seine vessel to engage in the fishery for salmon and Dungeness crab in the Cook Inlet area of Alaska. Notice of the application was published in the Federal Register, January 29, 1966.

William Rose Conley, Jr., Box 137, Wakefield, R. I. 02880, for the purchase of a used 51.7-foot wood vessel to engage in the fishery for red hake and miscellaneous species for industrial uses, groundfish, butterfish, flounders, and scup. Notice of the application was published in the Federal Register, February 1, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

Note: See Commercial Fisheries Review, February 1966 p. 89.

* * * * *

HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Maine Marine Products, Inc., Union Wharf, Portland, Maine, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 90-foot overall steel vessel to engage in the fishery for groundfish, whiting, swordfish, scallops, lobsters, shrimp, tuna, sharks, mackerel, flounders, and other flat fish, herring, and herring-like fish, and miscellaneous species for industrial use. A hearing on the economic aspects of this application was scheduled to be held. The U. S. Bureau of Commercial Fisheries published the notice of the hearing in the January 13, 1966, Federal Register.

Hercules Fishing Products, Inc., 37 Laurel St., Fairhaven, Mass., has applied for a fishing vessel construction differential subsidy to aid in the construction of a 88-foot overall wood vessel to engage in the fishery for scallops, groundfish, flounder, swordfish, and lobsters. A hearing on the economic aspects

of this application was scheduled to be held. Notice of the hearing appeared in the January 20, 1966, Federal Register.

Small Business Administration

LOAN FOR HAKE REDUCTION PLANT IN ABERDEEN, WASHINGTON:

A Small Business Administration (SBA) loan of $350,000 for a new hake-processing plant in Aberdeen, Wash., was announced on December 29, 1965. The loan will help Pacific Protein, Inc., equip a plant to produce meal, oil, and other products from hake. Private investors plan to supplement the loan with $200,000 capital. They expect the plant to be in operation by spring 1966 and to employ 40 people. (Seattle Post-Intelligencer, December 30, 1965, and other sources.)

Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

BUDGET: Both Houses Jan. 24, 1966, received the President's message (H. Doc. 335) transmitting his budget proposals in the amount of $112.8 billion for fiscal year 1967; referred to Committee on Appropriations. The text of the message is printed in Congressional Record, Jan. 24, 1966 (pp. 857-864).

The Budget of the United States Government, fiscal year ending June 30, 1967, 89th Congress, 2nd Session, House Document No. 335, Part 1, 449 pp., printed, and Part 2, 1308 pp., printed. Contains Budget Message of the President, summary tables and statistical information, and various special analyses.

FISH PROTEIN CONCENTRATE PLANTS: H. R. 12269 (Rivers of Alaska) introduced in House Jan. 24, 1966, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate; to Committee on Merchant Marine and Fisheries. Similar to S. 2720.

FOOD IRRADIATION PROGRAM: Rep. Bates spoke in the House Feb. 8, 1966, concerning recent notoriety in the news media given to the results of experimentation carried out under a Cornell-sponsored study on the effects of irradiated sugar solution on the growth of certain plant cells. He stated that this unfavorable publicity has placed unwarranted damage on the food irradiation program--an approach which may result in significant savings in crops, marine products, meats, and other foods at a time when the world as a whole is facing tremendous shortages. He inserted in Congressional Record, Feb. 8, 1966 (pp. 2368-2369) the referenced news article, together with letters from the Atomic Energy Commission and the Food and Drug Administration on this subject, which were received by the Joint Committee on Atomic Energy.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: Hearings have been scheduled for Feb. 18, 1966, before the Senate Commerce Committee on S. 2102, to protect and conserve the North Pacific fur seals, and to administer the Pribilof Islands for the conservation of fur seals and other wildlife, and for other purposes.

METRIC SYSTEM STUDY: House received Senate-passed S. 774 (Pell) to authorize the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States, and on Jan. 17, 1966, bill was referred to the House Committee on Science and Astronautics.

House Committee on Science and Astronautics, Jan. 18, 1966, met and ordered reported favorably to the House, S. 744 (amended), to provide that the Department of Commerce shall conduct a program of investigation, research, and survey to determine the practicability of the adoption by the United States of the metric system of weights and measures.

NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965: Introduced in House, H. R. 12138 (Tupper) Jan. 18, 1966, H. R. 12291 (Dingell) Jan. 25, H. R. 12337 (St. Germain) Jan. 26, and H. R. 12350 (Don H. Clausen) Jan. 27, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea grant colleges and programs by initiating and supporting programs of education, training, and research in marine sciences and a program of advisory services relating to activities in the marine sciences, to facilitate the use of the submerged lands of the Outer Continental Shelf by participants carrying out these programs, and for other purposes; to the Committee on Science and Astronautics. Similar to S. 2439.

NATURAL RESOURCES DEPARTMENT: Sen. Moss in Congressional Record, Feb. 4, 1966 (pp. 2085-2093), highlighting some of the developments in the water field pointed out that he feels his two bills should be passed if we are to find new sources of clean water and assure orderly and wise management of the water resources we already possess. The bills are S. 2435, which would establish a Department of Natural Resources, and S. Con. Res. 55, which expresses the sense of Congress that the U. S. Government refer the so-called NAWAPA (North American Water and Power Alliance) project to the International Joint Commission for study and an en-

gineering survey. He also inserted in the Record, numerous letters and editorials concerning water resources.

NORTHWEST ATLANTIC FISHERIES ACT OF 1950: S. 2847 (Magnuson) introduced in Senate, Jan. 29, 1966, to amend the Northwest Atlantic Fisheries Act of 1950 (Public Law 845-81); to Committee on Commerce. Sen. Magnuson inserted in Congressional Record, Jan. 28, 1966 (p. 1331), a letter dated Nov. 26, 1965, from the Assistant Secretary for Congressional Relations of the Department of State requesting the proposed legislation. At one point in the letter it was stated that the act presently is concerned only with the conservation of fish and shellfish. Proposed amendment would include the conservation of the harp and hood seals.

OCEANOGRAPHY: Rep. Hanna in extension of remarks Congressional Record, Jan. 20, 1966 (p. A258), inserted in the Record an article published in the Jan. edition of the organization organ called V. F. W. by Mr. Kenneth Wilson, titled "The Threat From Below: Russia Far Ahead of United States in Exploring the Bottom of the Ocean."

Rep. Van Deerlin inserted in Congressional Record, Jan. 27, 1966 (p. A392), a resume from the Jan. 22, 1966, Christian Science Monitor, titled "California Aids Study of Ocean," by Kimmis Hendrick.

Sen. Magnuson spoke in the Senate calling for more attention in the field of ocean exploration. He inserted in Congressional Record, Feb. 7, 1966 (pp. 2179-2181), an address given by Comdr. Scott Carpenter, Nov. 16, 1965, before the National Press Club, titled "Sea Lab II."

Rep. Rogers in extension of remarks Congressional Record, Jan. 25, 1966 (pp. A337-A339), requested that the address of Rep. Karth of Jan. 18 before the National Space Club, titled "Potential of Oceanography" be inserted in the Record.

OYSTER ENEMY--MSX: Rep. Fallon in extension of remarks inserted in Congressional Record, Feb. 2, 1966 (pp. A449-A450), an article from the Baltimore Sunday Sun, titled "Deadly New Enemy of the Oyster," by James F. Waesche. The article describes the appearance of the bacteria, MSX, destroying oysters and, possibly, other seafood. Also points out the urgency and the necessity for an overall survey of the Chesapeake Bay area.

PESTICIDES STANDARDS OF NONPERSISTENCE: H. R. 12163 (Fogarty) introduced in House, Jan. 19, 1966, to require certain standards of nonpersistence of synthetic pesticides, chemicals (economic poisons) manufactured in the United States or imported into the United States; to Committee on Interstate and Foreign Commerce. Similar to H. R. 6186.

SALMON CANNERY--INDEBTEDNESS OF ANGOON, ALASKA: S. 2862 (Gruening) introduced in Senate Feb. 2, 1966, H. R. 12735 (Rivers of Alaska) introduced in House Feb. 29, to release the community of Angoon, Alaska, from certain indebtedness; to Committee on the Judiciary. Sen. Gruening in Congressional Record, Feb. 2, 1966 (pp. 1806-1807), pointed out that this bill would allow the Secretary of the Interior to release the people of Angoon from the debt they owe for loans made in 1948 for the operation of a salmon cannery, which was destroyed by fire in 1961, thereby losing any possibility of eventually recouping and operating profitably. He also inserted in the Record a resolution of the Angoon Community Association urging that Congress pass legislation to relieve the Angoon Community Association of the obligation to pay to the Federal Government loans made for the operation of the cannery and for the purchase of fishing boats.

STATE OF THE UNION MESSAGE: H. Doc. 321: Message from the President of the United States, transmitting, State of the Union Message--The Address of the President of the United States; referred to the Committee of the Whole House on the State of the Union, House of Representatives, 89th Congress, 2nd Session, Jan. 12, 1966, 11 pp. printed.

U. S. FISHERY INDUSTRY REVIEW: Sen. Bartlett, Feb. 7, 1966, spoke in the Senate concerning the important past 5 years of the U. S. fishing industry during which time the Congress has authorized research and development projects and programs to encourage modernization of our fishing fleet, in addition to enacting legislation affecting relations with foreign fishing interests. He inserted in Congressional Record, Feb. 7, 1966 (pp. 2111-2116), a speech he made Jan. 15, 1966, before the Petersburg Chamber of Commerce, titled "The U. S. Senate and the U. S. Fisheries--A 5-Year Review" and the "Summary of U. S. Fishery Legislation."

U. S. FISHING BOAT SEIZURES: Rep. VanDeerlin in extension of remarks Congressional Record, Feb. 7, 1966 (pp. 2320-2321), spoke in the House concerning the recent illegal seizures of U. S. flag vessels which were engaged in lawful pursuits in open waters. The nations concerned are Chile, Ecuador, Peru, and Colombia. The vessels concerned are a purse seiner which was illegally taken from the high seas and held in a Colombian port; and tuna boats operating off the west coast of South America, and taken into the ports of South American countries. He states that methods of persuasion and argument used by the State Department have often proved unavailing; that the time has come for consideration of methods stronger than mere persuasion, methods that will serve to convince every nation that while the United States will scrupulously regard the rights of others on the high seas, we will insist that others give equal regard to our own rights.

WATER POLLUTION: Sen. Douglas inserted in Congressional Record, Jan. 19, 1966 (pp. 563-567), a series of articles which have appeared in several newspapers, written by Sen. Nelson, on our nationwide pollution problem. This series of articles explains the way in which pollution is ruining our fresh water assets, killing our fish, and threatening our municipal water supplies. The articles cover various types of pollution from municipal sewage, industrial wastes, pesticides, septic tanks, detergent chemicals, and ships; and contains a suggested new approach to pollution prevention.

Sen. Dorn inserted in Congressional Record, Feb. 7, 1966 (pp. 2295-2296), a speech delivered by Rep. Blatnik on Feb. 7, 1966, in Washington, D. C., before scientists and executive offices of the major chemical industries, titled "Water--Master or Servant."

Sen. Nelson inserted in Congressional Record, Feb. 8, 1966 (pp. 2450-2451), an article from the Feb. 6, 1966 Washington Star, titled "Tests Hint New Detergent Hits Fish Harder Than Old," by Orr Kelly.

Rep. Grabowski inserted in Congressional Record, Feb. 8, 1966 (pp. A598-A599), the covering statement

that accompanied a report recently received in House, titled "Interim Report of the International Joint Commission, United States and Canada, on the Pollution of Lake Erie, Lake Ontario, and the International Section of the St. Lawrence River," by Hon. Matthew E. Welsh, chairman of the U. S. section of the Commission.

WATER POLLUTION CONTROL AMENDMENT: Introduced in House, H. R. 12166 (McCarthy) Jan. 19, 1966, H. R. 12243 (Bingham) Jan. 24, H. R. 12533 (Murphy of N. Y.) Feb. 3, and H. R. 12734 (Resnick) Feb. 9, to amend the Federal Water Pollution Control Act to increase by $750 million the authorization of appropriation for the fiscal year of 1967, and to authorize payment to be made to States for retirement of certain bonds; to Committee on Public Works. Sen. McCarthy pointed out in Congressional Record, Jan. 19, 1966 (p. 531), that his bill would permit the State to recapture half the funds on waste treatment projects where they provide 60 percent (30 percent, State share; and 30 percent, prefinanced Federal share).

H. R. 12454 (Conte), H. R. 12456 (Horton), H. R. 12457 (Mathias), and H. R. 12458 (Morse) introduced in House, Feb. 2, 1966, to amend section 8 of the Federal Water Pollution Control Act to provide for increased grants for construction of treatment works; to Committee on Public Works.

S. 2851 (Kennedy of Mass.) introduced in Senate Jan. 28, 1966, to amend the Federal Water Pollution Control Act with respect to grants for construction of treatment works; to Committee on Public Works.

WATER PROJECT RECREATION ACT: The Senate received a concurrent resolution from the Legislature of the State of South Dakota relating to the benefits of outdoor recreation facilities and fish and wildlife enhancement in connection with water resources projects. The resolution was referred to the Committee on Interior and Insular Affairs.

WORLD HUNGER ACT OF 1966: H. R. 12375 (Stalbaum) introduced in House Jan. 27, 1966, to amend the Agricultural Trade Development and Assistance Act of 1954; to Committee on Agriculture. Rep. Stalbaum pointed out in Congressional Record, Jan. 27, 1966 (pp. 1310-1314), that his bill revamps our food-for-peace approach among the countries of the world. He also stated that the bill contains four main categories: (1) the development of capital agricultural and agri-business facilities, (2) the improvement of production methods, (3) the conducting of research and study, and (4) the coordination of our activities with others interested in the same objective. He also stated that research in related areas, such as marine sources, cannot be overlooked in this crucial war on hunger.

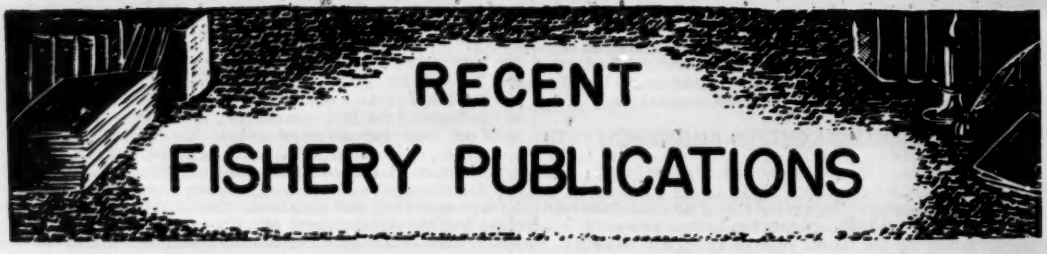
S. 2826 (Mondale) introduced in Senate, Jan. 26, 1966, to amend the Agricultural Trade Development and Assistance Act of 1954, as amended, in order to encourage and stimulate increases in the food and agricultural production of developing nations receiving assistance under such act, to facilitate increased United States efforts to meet the threat of growing human hunger and malnutrition, and for other purposes; to Committee on Agriculture and Forestry. Similar to H. R. 12375. Sen. Mondale in Congressional Record, Jan. 26, 1966 (pp. 1116-1118), pointed out that this bill is directed toward the objective expressed by President Johnson in his State of the Union message, to reshape and expand our food-for-peace program. Would establish a new category of loans and grants to promote programs devoted specifically to improvement of food production and distribution in the friendly nation from which the foreign currency was obtained. One of the programs cited was the development of commercial fishing fleets. Would also establish binational foundations for improving food and agricultural production. Would eliminate the general requirement that food used in this program must be in surplus, and it would create a Cabinet-level policy council to recommend broad levels of food and agricultural assistance which would best further the foreign policy objectives of the United States.

(First Session)

EXPORT EXPANSION ACT: Export Expansion: Hearings before the Committee on Commerce, United States Senate, 89th Congress, 1st session on S. 558, a bill to authorize the Secretary of Commerce to carry out certain programs to develop and expand foreign markets for United States products, and to provide more effectively for assistance in the financing of certain foreign sales which are affected with the national interest, Mar. 17, 18, and 19, 1965, Serial No. 89-35, 280 pp., illus., printed. Contents include various agency comments, statements, letters and wires of various Federal officials, members of Congress, representatives from various business firms.

FOOD IRRADIATION PROGRAM: Radiation Processing of Foods: Hearings before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy Congress of the United States, Eighty-Ninth Congress, 1st session, on Radiation Processing of Foods, June 9 and 10, 1965, 826 pp., illus., printed. Contents include statements and correspondence from various Federal officials, doctors, and representatives of business firms. One section of the report deals with "Marketing Feasibility Study of Radiation Processed Fishery Products," prepared by the United States Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries. It also includes a report "Irradiation Nears Reality--Pilot Plant Will Pioneer Processing, Shipping, and Marketing of Irradiated Seafoods," by Joseph W. Slavin, Bureau of Commercial Fisheries, and P. Miller, Associated Nucleonis, Inc. Fish meal is included in the study of the economics of controlling Salmonellae in foods by the use of ionizing radiation.

Note: REPORT ON FISHERY ACTIONS IN FIRST SESSION OF 89TH CONGRESS: The U.S. Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number	Title
CFS-3777	- Canned Fishery Products, 1964 Annual Summary (Revised), 17 pp.
CFS-3946	- Imports & Exports of Fishery Products, 1963-64 Annual Summaries, 12 pp.
CFS-3967	- Chesapeake Fisheries, 1964 Annual Summary, 9 pp.
CFS-3969	- Texas Landings, July 1965, 3 pp.
CFS-3970	- Texas Landings, August 1965, 3 pp.
CFS-3971	- Shrimp Landings, May 1965, 5 pp.
CFS-3972	- New York Landings, September 1965, 4 pp.
CFS-3976	- Alabama Landings, September 1965, 3 pp.
CFS-3977	- Maine Landings, September 1965, 4 pp.
CFS-3978	- Massachusetts Landings, April 1965, 8 pp.
CFS-3979	- Massachusetts Landings, May 1965, 9 pp.
CFS-3981	- Massachusetts Landings, June 1965, 9 pp.
CFS-3983	- Alaska Fisheries, 1964 Annual Summary, 8 pp.
CFS-3986	- Florida Landings, October 1965, 8 pp.
CFS-3987	- Fish Meal and Oil, October 1965, 2 pp.
CFS-3989	- New Jersey Landings, October 1965, 3 pp.
CFS-3990	- Louisiana Landings, October 1965, 3 pp.
CFS-3991	- California Landings, August 1965, 4 pp.
CFS-3993	- Rhode Island Landings, August 1965, 3 pp.
CFS-3995	- Texas Landings, September 1965, 3 pp.
CFS-3997	- Mississippi Landings, September 1965, 3 pp.
CFS-4001	- Rhode Island Landings, September 1965, 3 pp.
CFS-4003	- Maine Landings, October 1965, 4 pp..
CFS-4004	- Florida Landings, November 1965, 8 pp.
CFS-4006	- Shrimp Landings, June 1965, 5 pp.
CFS-4010	- Texas Landings, October 1965, 3 pp.

Sep. No. 752 - Trawl Cod-End Mesh Size Selectivity Toward Yellow Perch in Lake Erie.

Sep. No. 753 - Skipjack Tuna (Katsuwonus pelamis) Resources of the Trust Territory of the Pacific Islands.

Sep. No. 754 - Equipment Note No. 18--A Nekton Ring Net Sampler for Use Aboard Oceanographic Research Vessels.

Sep. No. 755 - Review of U. S. Menhaden Industry, 1965.

SSR-Fish. No. 520 - Bait Shrimp (Penaeus duorarum) in Tampa Bay, Florida--Biology, Fishery Economics, and Changing Habitat, by Carl H. Saloman, 19 pp., illus., October 1965.

SSR-Fish. No. 521 - Bureau of Commercial Fisheries Symposium on Red Tide, by James E. Sykes, 11 pp., September 1965.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES, TROPICAL ATLANTIC BIOLOGICAL LABORATORY, 75 VIRGINIA BEACH DRIVE, MIAMI, FLA. 33149.

On the Tunas of Angola, by H. Vilela and R. Monteiro, Translation No. 5, 40 pp., 1965. (Translated by John P. Wise from the Portuguese, Boletim da Pesca, Lisbon, Portugal, Ano XII, no. 64, pp. 11-54 (1959). The first two parts in a series of studies on the biology and fishery of the tunas off the west coast of Africa, sponsored by the Marine Biology Mission of the Overseas Department, Government of Portugal. Part I of this report deals with the methods of the commercial fishery and the catch of tuna off the coast of Angola. Part II deals with the biometry of Neothunnus albacora (Lowe), the name used throughout the report for yellowfin tuna.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, November and December 1965, 16 and 18 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tuna-like fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, November 1965, 10 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif.

92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, November and December 1965, 9 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, November and December 1965, 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower North Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, November and December 1965, 21 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--November 1965, 18 pp. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, November and December 1965, 8 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AFRICA:

Articles from Industrias Pesqueras, vol. 39, no. 921, September 1965, illus., printed, single copy 50 ptas. (about US$0.85). Industrias Pesqueras, Apartado 35, Policarpo Sanz, 21-3, Vigo, Spain:

"Campana de un buque aleman de investigacion en las costas de Africa occidental" (Investigations of a German exploratory vessel on the West African Coast), p. 405.

"Los flotas del Atlantico Africano" (The African Atlantic fleets), pp. 406-407.

ALGAE:

An Introductory Account of the Smaller Algae of British Coastal Waters. Part V. Bacillariophyceae (Diatoms), by N. I. Hendey, Fishery Investigations, Series IV, xxii + 317 pp., plates I-XLV, illus., printed, 1964, £9 (about US$25). Her Majesty's Stationery Office, London, England. (For sale by Sales Section, British Information Service, 845 Third Ave., New York, N. Y. 10022.)

ANCHOVY:

"Tecnico Conserveras; Proceso de fabricacion de las conservas de anchoa" (Canning technique--anchovy canning method), article, Industria Conservera, vol. 31, no. 315, September 1965, pp. 247-250, printed in Spanish, single copy 25 ptas. (about US$0.40). Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

ARGENTINA:

Publications, processed in Spanish, available from Departamento de Investigaciones Pesqueras, Direccion General de Pesca, Secretaria de Estado de Agricultura Ganaderia, Buenos Aires, Argentina:

La Pesca de la Merluza en el Mar Argentino, Durante el Ano 1963, Areas de Captura y Rendimientos (The Fishery of Hake in the Argentine Sea During 1963, Areas of Capture and Yield), by Luis Vazquez and others, 22 pp., 1964.

Produccion Pesquera Argentina, Primer Semestre 1965 (Argentine Fishery Production, First six months 1965), 15 pp., September 1965.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

AUSTRALIA:

Articles in Australian Fisheries Newsletter, vol. 25, no. 1, January 1966; Fisheries Branch, Department of Primary Industry, Canberra, Australia: "Fish production declines," p. 6; "Exports and imports rise," p. 7; "Tuna purse-seined in New South Wales," p. 9; "Scallops boost Victorian production," by A. Dunbavin Butcher, pp. 16-17; "CSIRO's fisheries research program," by G. L. Kesteven, pp. 22-23; and "Pearling industry progress," p. 29.

Oceanographical Cruise Reports: Oceanographical Observations in the Indian Ocean in 1963, H. M. A. S. "Diamantina," processed, 1965; Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization (CSIRO), Melbourne, Australia:

No. 23 - Cruise Dm 1/63, 175 pp.

No. 24 - Cruise Dm 2/63, 153 pp.

BILLFISH:

"Maryland billfishes," by Frank Schwartz, article, Maryland Conservationist, vol. XXXVIII, no. 4, July-Aug. 1961, pp. 20-24, illus, printed, single copy 25 cents. Maryland Conservationist, State Office Bldg., Box 231, Annapolis, Md.

BONITO:

"Tecnica Conservera--bonito, diagrama del proceso del recorrido" (Canning technique--bonito, diagram of processing line), article, Industria Conservera, vol. 31, no. 314, August 1965, pp. 218-223, printed in Spanish, single copy 25 ptas. (about US$0.40). Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

CANADA:

Circular No. 7 (a collection of six short articles specially written for freshwater fishermen), 43 pp., illus., printed, September 1965. Fisheries Research Board of Canada, Biological Station and Technological Unit, London, Ontario. Among the articles included are: "The Keeping Qualities of Fish Sausages and Wieners," by A. S. Bogoslowski; "A New Method of Identifying Various Species of Fish," by J. F. Uthe; "Preparation for the Advance of Sea Lamprey Control from Lake Superior into the Lower Great Lakes," by J. J. Tibbles; "A Method for Chilling Bulk Quantities of Freshwater Smelt," by A. W. Lantz; and "Air-Blast Freezers for Freshwater Fish," by A. W. Lantz.

"Coast to coast expansion launched by Fisheries Research Board," article, Trade News, vol. 18, no. 4, Oct. 1965, pp. 3-5, illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

CATFISH:

"Catfishes," by Frank Schwartz, article, Maryland Conservationist, vol. XXXVIII, no. 5, Sept.-Oct. 1961, pp. 21-26, illus., printed, single copy 25 cents. Maryland Conservationist, State Office Bldg., Box 231, Annapolis, Md.

CONSERVATION:

Illinois Resource Management--Fish Conservation Teacher's Manual, by Alvin C. Lopinot, 94 pp., illus., printed, 1965. Division of Conservation Education, Office of Superintendent of Public Instruction, Department of Conservation, 316 South Second St., Springfield, Ill. 62706. A comprehensive educational program includes learning about the conservation and use of resources. With the increase in population and the recent trend toward enjoyment of the out-of-doors, it is important that students and adults become knowledgeable about fish conservation. This bulletin contributes to that goal. The author gives a history of fish conservation in Illinois, and discusses limnology--the science which deals with the study of lakes and streams--and fishery biology. A few of the more important, most common, or unusual fish in Illinois are described briefly to show their habits, distribution, and economic value. Fisheries management, pollution, commercial and sport fishing, bait minnow propagation, and lake construction are also discussed.

CUBA:

Articles from Mar & Pesca, vol. 1, Oct. 1965, illus., printed in Spanish, annual subscription $3.50, Mar & Pesca, Amargura y San Ignacio, Havana, Cuba:

"Un futuro en el mar" (A future in the sea), by R. Bofill, pp. 30-33.

"El puerto pesquero base de la abundancia" (The fishing port as a fount of plenty), by Jose R. Savall, pp. 17-19.

DIRECTORIES:

Fisheries Year Book and Directory, 1965-66, 471 pp., illus., printed, £2 (US$5.60) postpaid. British-Continental Trade Press Ltd., 222 Strand, London WC2, England. Contains concise summaries of 1964 fishery landings, processing, and other developments in Japan, U.S.S.R., Peru, the United States, Canada, the United Kingdom, Norway, South Africa, France, Germany, Poland, and 27 other countries. A chapter titled "Fishing Vessel Construction and Equipment" reviews developments in that field and lists fishing vessels completed or on order during 1964 in major fishing countries. Another chapter on "Research Results and Progress Report" (1) reviews the condition of fish stocks exploited by Great Britain; (2) describes British research on fishing gear, marine biology, and fish farming; and (3) reports on British studies on fresh fish handling, fish freezing, and processing being carried out at the Torry Research Station (Aberdeen) and the Humber Laboratory (Hull). Other articles discuss (1) developments in fish meal and oil, and (2) fish freezing, storage, transport, and merchandising. Includes a dictionary of fish names in eight languages; a fish supply calendar; a list of fishery organizations and trade associations throughout the world; a list of trade journals of interest to the fishing industry; a world directory giving the particulars of thousands of firms, including fishing companies, wholesalers, exporters, importers, canners, firms dealing in fish byproducts, suppliers of machinery and equipment, shipbuilders, marine outfitters, and cold-storage and transport firms; a list of newly introduced trademarks and brands; and a classified guide for buyers. An unusual feature is a photographic plate showing new postage stamps with fish designs issued during 1964.

--Henry R. Beasley

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

EAST GERMANY:

Zeitschrift für Fischerei und Deren Hilfswissenschaften, vol. 13 N. F., no. 1/2, 1965, 164 pp., illus., printed in German with English abstracts. Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin, Berlin, German Democratic Republic. (Available from Neumann Verlag, Dr. Schmincke Allee 19, Radebeul 1, German Democratic Republic.) Some of the articles are: "Der Meeresfischfang und die mit ihm verbundene Fischereiwissenschaft in Bulgarien" (Bulgarian sea fisheries and fishery investigations), by P. Kolarov; "Der Bewuchs an Ostsee-Fischkuttern" (Investigations of ship fouling organisms of Baltic Sea fishery cutters), by H. J. Subklew and S. Schulz; and "Vergleichende Untersuchungen uber die Einwirkung verschiedener Herbizide auf submerse Pflanzen und Algen unter Laboratoriumsbedingungen" (Comparative research of the effect of various herbicides on submerged plants and algae under laboratory conditions).

ELECTRICAL FISHING:

Einführung in die Elektrofischerei (Introduction to Electrical Fishing), by Paul F. Meyer-Waarden, Inge Halsband, and Egon Halsband, 304 pp., illus., printed in German, 1965, DM 24.60 (about US$6.50). Westliche Berliner Verlagsgesellschaft Heenemann KG, 1 Berlin 31 (Wilmersdorf), German Federal Republic. The authors of this book are fishery biologists and physiologists in the Institute for Fisheries Research of the Federal Republic of Germany. They report on their 10 years of studies in the field of electrical fishing. The book has information of interest to professional personnel working in this field and also for practical use by laymen faced with different types of problems in catching or controlling various aquatic species. After an introduction and definition of some of the technical concepts involved, the authors go into some detail about the fundamental principles involved in the application of electrical current to fish. For example, chapter 3 contains, among other things, the mathematical formula which has been developed to precisely determine the varying amounts of current required to shock fish of different sizes. The effect on the metabolism of fish when electrical current passes through them is given as well as differences in salt water and fresh water application of this process. The limits on pulse rates and the narcoticizing pulse rate for different species of fish are listed and many other fundamental principles applicable in this field are discussed. There follows a short chapter on the possible uses of electrical fishing devices for attracting, repelling, stupefying, or killing fish. Various conditions for use or application of the process are given, such as, selecting out predators from an area inhabited by different species, catching fish which evade conventional types of gear, directing fish away from turbines, etc. Other situations applicable to both fresh- and salt-water fishery resources are mentioned. Following this there is a lengthy chapter describing the various kinds of electrical fishing gear which have been used and are available. Manufacturers names are also indicated and many excellent photographs of the actual devices are shown. The application of appropriate gear for attracting as well as repelling fish is described and the application of the appropriate gear for fresh-water and salt-water operations is also given in quite some detail. The proper application dependent on the species is also described and runs the range from sardines to whales, including certain shellfish such as crabs. Other possibliities for use of the gear are cited. The authors indicate possibilities for use in capturing crocodiles and also inhibiting the growth of bacteria, particularly in certain foods. The special and more difficult conditions one faces in using the gear in fresh water are treated in a special chapter devoted to this subject. The care and the upkeep of the equipment when used in freshwater areas are discussed. Some general description of specifications for construction and operation of such equipment are given. In addition there is a chapter on the safety requirements which must be observed in order to protect personnel operating such gear. The final chapter cites laws and regulations concerning the operation of electrical fishing devices in various jurisdictions of the Federal Republic of Germany, including provincial laws and regulations. A somewhat lengthy bibliography is provided which reveals the extensive work conducted earlier. The book, in addition to reflecting much of the authors' original work also draws together much which is useful from earlier sources. A glossary of technical terms is given in German, English, French, and Russian. A qualified list of patents in the electrical fishing field is also provided.

--W. H. Stolting

FISH:

Fishes of the World in Color, by Hans Hvass, illustrated by Wilhelm Eigener, translated by Gwynne Vevers, 156 pp., printed, 1965, $4.95. E. P. Dutton and Co., Inc., 201 Park Ave. South, New York, N. Y. 10003. Some 1,000 species of fish from all over the world are to be found in this book. Those selected are principally commercial fish and those caught by anglers. But, in addition, as many species as possible of aquarium fish have been included. Each species is illustrated with a special colored sketch, accompanied by text giving some pertinent facts and its geographical distribution. The fish are divided into ray-finned fish (bony fish, bony ganoids, sturgeon, etc.); coelacanth; lungfish; cartilaginous fish (rabbitfish, rays and skates, shark and dogfish), and cyclostomes (lamprey and hagfish). The English name of each fish shown in the book is printed in bold type, followed by the scientific or Latin name printed in italics. An index of the common names is included. Anyone interested in fisheries will find this book interesting and useful.

--Joseph Pileggi

FISHING GROUNDS:

"Las pesquerias del Indico Austro-Africano" (The fishing grounds of India-South Africa), article, Industrias Pesqueras, vol. 39, no. 919, August 1965, pp. 362-363, illus., printed in Spanish, single copy 50 ptas. (about US$0.85). Industrias Pesqueras, Apartado 35, Policarpo Sanz, 21-2, Vigo, Spain.

FISH MEAL:

"El 'boom' Peruano de la 'fish meal.' II. La fluctuacion economica y el futuro" (The 'boom' from the Peruvian 'fish meal.' II. Economic fluctuation of the future), article, Industrias Pesqueras, vol. XXXIX, no. 916, June 1965, pp. 284-285, illus., printed in Spanish, single copy 50 ptas. (about US$0.85). Indus-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

trias Pesqueras, Apartado 35, Policarpo Sanz, 21-2, Vigo, Spain.

FOOD AND AGRICULTURE ORGANIZATION:
Indo-Pacific Fisheries Council Proceedings, 11th Session, Kuala Lumpur, Malaysia, 16-31 October 1964, Section I, 97 pp., processed in English, 1965, US$1. IPFC Secretariat, FAO Regional Office for Asia and the Far East, Bangkok, Thailand, 1965. (Sold by Publications Section, FAO, via delle Caracalla, Rome, Italy.) The full proceedings of this session of the Council consists of three sections. This is a report of Section I. Section II comprises the Technical Papers presented at the meeting and Section III contains the papers read at the symposium.

FRANCE:
"How France Trains Its Crews--Nine-Month Course at Boulogne School," article, World Fishing, Nov. 1965, pp. 39-40, illus., printed in English, 3s. 6d. (about US$0.55). Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England. Describes the subject matter and educational theory of apprentice training for fishermen at the secondary school level in France.

INDIA:
Development of Fisheries in the Cochin Area, An Export Oriented Project Report, 110 pp., printed in English, January 1965. Marine Products Export Promotional Council, Ernakulam, Kerala State, India. Describes how India's fishery export trade came to be centered in the Cochin area of southeast India. Surveys that area's fishery resources, fleet, processing and support facilities, and export markets. Makes recommendations for further development by carrying out oceanographic and fishery research surveys; improving the fishing fleet, harbors, processing equipment, transport facilities; providing training; and conducting more intensive marketing. The report was prepared at the request of an Inter-Ministerial Group in the Indian Government which met November 7, 1964, in New Delhi to consider ways of increasing India's fishery exports. Similar export-oriented reports were planned for other areas including Goa and Ratnagiri.

INDUSTRIAL PRODUCTS:
Fishery By-Products Technology, by Julius Brody, 245 pp., illus., printed, 1965, $12.50 U.S., $13.50 foreign. The Avi Publishing Co., Inc., P.O. Box 388, Westport, Conn. This is a comprehensive summary of the manufacture of practically all fishery byproducts and of the industrial application of those products. The foreword points out: "If meaningful advances are to be made in the utilization of the oceans for the feeding of man, if lowest costs of edible fishery products are to be achieved, attention must be paid to by-product utilization. Optimal utilization of by-products will not only result in better utilization of our resources but also in lower-cost foods." Emphasis is placed on the lesser known products in order to show their valuable potential to fishery processors and allied manufacturers. Recent developments in processing and use of the better known byproducts are considered in detail. Descriptions of inexpensive manufacturing procedures designed for the benefit of developing seacoast countries are given. The book is divided into three major parts: Part I describes the byproducts obtained from the outer portion of fish, i.e., skins and scales; Part II discusses derivatives from entrails; and Part III deals with byproducts obtained from fish scrap remaining after gutting and filleting, or by using the whole fish, e.g., trash fish or industrial fish. The individual chapters deal with liquid fish glue; gelatin and isinglass production; pearl essence; leather production from fish skins; fish-liver oils; non-fat components of fish oils; production of vitamin concentrates; salmon egg byproducts and other salmon cannery waste; insulin, biochemical and pharmaceutical products of special interest; fish meal production; general considerations of fish oils; fish-body oil; refining and utilization of fish oils; production of fish albumin, peptones, and amino acids; animal feed; plant food; and last but not least, fish protein concentrate (fish flour). Each chapter ends with a bibliography, and there is an adequate overall index. Food technologists, food scientists, nutritionists, research chemists, fishery plant operators, biochemists, plant food and animal feed manufacturers, students, economists, dealers, and others will find this book a useful tool for study and reference.

--Joseph Pileggi

JAPAN:
Bulletin of the Faculty of Fisheries, Nagasaki University, no. 19, 195 pp., illus., printed in Japanese with English summaries, October 1965. The Faculty of Fisheries, Nagasaki University, Nagasaki, Japan. Some of the articles are: "On the Porpoises Caught by the Salmon Fishing Gill Net in Bering Sea and the North Pacific Ocean," by K. Mizue and K. Yoshida; "Analysis of Fish-Finder Record - VI. On the fish-finder for biomeasurement," by K. Shibata; "On the Tuna Long-Line Fishing Ground in Summer in the Southern Waters of Sumatra," by S. Abe, S. Yada, T. Takada, and S. Inoue; "The Feeding of Rainbow Trout Fry with Natural Foods and the Maximal Growth in their Younger Stages," by S. Shirahata.

LOBSTER:
"The American lobster," by D. G. Wilder, article, Trade News, vol. 18, no. 4, Oct. 1965, pp. 6-11, illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Describes the American lobster (Homarus americanus); distribution, feeding, and movements; molting, growth, and age; maturity, mating, and egg laying; disease and parasites; fishing gear and landings; fishing seasons; minimum size limits; protection of egg-bearing females; offshore fishery; and storage and marketing.

"En el paraiso de la langosta" (In the lobster paradise), by Pedro Morales, article, Mar & Pesca, vol. 1, October 1965, pp. 34-38, illus., printed in Spanish, annual subscription $3.50. Mar & Pesca, Amargura y San Ignacio, Havana, Cuba.

"Notes on trends in the abundance of the west coast rock lobster," by A. E. F. Heydorn, G. C. Newman, and G. S. Rossouw, article, The South African Shipping News and Fishing Industry Review, vol. XX, no. 10, October 1965, pp. 91, 93, 95, 97, 99, 103, illus., printed, single copy 30¢ (about US$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., Trust House, Thibault Sq., Box 80, Cape Town, South Africa Republic.

MARINE BIOLOGY:
"On the biology of the commoner gadoids in Manx waters," by A. K. Nagabhushanam, article, Journal of

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

the Marine Biological Association of the United Kingdom, vol. 45, no. 3, pp. 615-657, illus., printed, October 1965, $13.50. Cambridge University Press, 32 East 57th St., New York, N. Y. 10022.

NORWAY:

Fiskeristatistikk 1963 (Fishery Statistics 1963), Norges Offisielle Statistikk XII 179, 83 pp., illus., printed in Norwegian with English table of contents, 1965. Fiskeridirektøren (Director of Fisheries of Norway), Bergen, Norway. Contains statistical summaries on the quantity and value of the yield in principal Norwegian sea fisheries; quantity and value of each species; disposition of landings; production of processed fishery products; and foreign trade. Also contains data on prices, subsidies, income, investments, and loans in the Norwegian fishing industry; data on Norwegian fishermen and fishing vessels; and related facts and figures.

Articles from Tidsskrift for Hermetikindustri (Norwegian Canners Export Journal), vol. 51, illus., printed in Norwegian, foreign annual subscription kr. 20.00 (US$2.80), Norske Hermetikfabrikers Landsforening, Stavanger, Norway:

"Industriel tralfiske dobbeltfrysing av fisk norsk filetindustri" (Industrial trawl fishery, double freezing of fish, and Norwegian fillet industry), by Gustav Lorentzen, no. 11, Nov. 1965, pp. 442-451.

"Industriel optøning af fisk" (Industrial thawing of fish), no. 10, Oct. 1965, pp. 385-393, and 410.

OCEANOGRAPHY:

"Helztu nidurstodur fundar norskra, sovezkra og islenzkra haf og fiskifraedinga, haldinn a Seydisfirdi 20-22 juni 1965" (Major conclusions of the meeting of oceanography fishery specialists from Norway, Russia, and Iceland held at Seydisfirdi on June 20-22, 1965), article, Aegir, vol. 58, no. 15, pp. 248-249, illus., printed in Icelandic, Sept. 1, 1965. Aegir, Rit Fiskifelags Islands, Reykjavik, Iceland.

Pendulum Gravity Measurements at Sea, 1936-1959, Lamont Geological Observatory Contribution No. 807, by J. L. Worzel, xx + 420 pp., illus., printed, October 1965, $28. John Wiley & Sons, Inc., Publishers, 605 Third Ave., New York, N. Y. 10016. Records for the first time 3,000 new gravity measurements made with pendulums in submarines--two-thirds of all the measurements ever made. It serves as a framework upon which surface-ship observations can build, and represents a first view of the structure of what has been called the normal part of our planet--the ocean. The observations are arranged so that they can be found either by cruise or by geographical area. Base stations are detailed in a special section. Another feature is the presentation of all the gravity observations taken to date superimposed on the oceanic topography (both as free-air and as Bouguer anomalies) on charts suitable for mounting as a composite world chart. Interpretations of these data are given from both a geodetic and structural view of the world. Special attention is given to the physics of the measurement techniques. Apparatus modifications and improvements are detailed, and the resulting geodetic, geophysical, and geological implications are discussed at length.

PERU:

"The Anchovy Crisis," article, The Economist, vol. CCXVII, no. 6383, December 25-31, 1965, pp. 1,429-1,430, illus., printed in English, annual subscription £6 10s. (about US$18.20). The Economist, 25 St. James Street, London SW1, England. Describes the oceanic conditions and economic impact of the recent decline of the Peruvian anchovy resource.

POLAND:

Articles from Prace Morskiego Instytutu Rybackiego w Gdyni (Reports of the Marine Fisheries Institute at Gdynia), vol. 13, series A (1965), Oceanography and Fishery Biology, printed in Polish with English summaries. Wydawnictwo Morskie, Gdynia, Poland:

"Biological characteristic of cod (Gadus morrhua callarias L.) from Bornholm Basin during 1957-1960," by E. Stanek, pp. 57-84.

"Eel (Anguilla anguilla L.) of the Wista Estuary," by J. Filuk, pp. 101-114.

"Age and rate of growth of perch (Perca fluviatillis L.) from the Wista Estuary," by H. Krawczak, pp. 115-130.

POLLUTION:

Critical Review of the Effects of Synthetic Detergents on Aquatic Life, by R. Marchetti, Studies and Reviews General Fisheries Council for the Mediterranean No. 26, 34 pp., processed, October 1965. GFCM Secretariat, Food and Agriculture Organization of the United Nations, Rome, Italy. Discusses "pollution due to surface active agents (surfactants), that is, that group of substances used to prepare commercial detergents." Covers foam formation; eutrophication; and toxic action including toxicity limits, variations of toxicity due to biological factors, variations of toxicity due to nonbiological factors, probable causes of the surfactants' toxicity and histological effects, and toxic effects of the surfactants on invertebrates, algae, and aquatic plants.

REFLECTION OF LIGHT:

Articles from Journal of the Marine Biological Association of the United Kingdom, vol. 45, no. 3, pp. 711-737, 683-703, illus., printed, October 1965, $13.50. Cambridge University Press, 32 East 57th St., New York, N. Y. 10022: "Reflexion of light by external surfaces of the herring, Clupea harengus"; and "Studies on reflexion of light from silvery surfaces of fishes, with special reference to the bleak Alburnus alburnus," by E. J. Denton, F. R. S. and J. A. C. Nicol.

SALMON:

"Fishing Treaties and Salmon of the North Pacific, by W. F. Thompson, article, Science, vol. 150, no. 3705, December 31, 1965, pp. 1786-1789, illus., printed. Reprints available from College of Fisheries (Att: Dean Richard Van Cleve), University of Washington, Seattle, Wash., 98105. Discusses present treaties, economic in intent, and claims they cannot be made effective for conservation without more knowledge. Discusses present state of knowledge and how attempts are made at conservation. Appeals to scientists familiar with principles of ecology, genetics, speciation, geographic distribution, and population problems to respond and lend influence to formulation of a scientific basis for these treaties and for conservation of our fisheries in general.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

The Possibility of Salmon Smolt Passing Unharmed through Power Plant Turbines when Descending to the Sea, by Erik Monten (Translation from Om Utvandrande Laxungars Möjligheter att Oskadda Passera Genom Kraftverksturbiner (Preliminärt Meddelande) Laxforskningsinstitutet. U. S. Joint Publications Research Service for the Fish-Passage Research Program, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

SALMON AND TROUT:
"Investigation and management of Atlantic salmon and trout, Part 1--the research program, Part 2--the management program," article, Trade News, vol. 18, no. 2-3, August-September 1965, pp. 3-13, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Part 1 discusses the research by the Biological Stations, Fisheries Research Board of Canada, at St. Andrews, New Brunswick, and St. John's, Newfoundland. Part 2 concentrates on the management program.

SHAD:
"The American shad," by Alfred L. Meister, article, Maine Fish and Game, vol. VII, no. 2, Fall 1965, pp. 9-10, illus., printed, single copy 25 cents. Maine Fish and Game Magazine, Room 600, State Office Building, Augusta, Maine 04330.

SOUTH AMERICA:
Anuario de Pesca 1964/1965 (Fisheries Yearbook 1964/1965), 146 pp., illus., printed in Spanish, $10. Ediciones Sudamerica S. A., Av. Wilson 911, Lima, Peru. Includes articles on: "Breve historia de la pesqueria Peruana" (Early history of the Peruvian fisheries), by W. F. Doucet and Hermann Einarsson; "Nuestra pesqueria y su futuro" (Our fisheries and their future), by I. V. Aguirre; "Bancos de pesca--comercializacion y mercados para pescado" (Fishing Areas--distribution and marketing of fish), by W. F. Doucet; "Recurso numero 1: anchoveta" (Resource no. 1: anchovy), by Hermann Einarsson; "Record mundial: 9 millones de toneladas" (World record: 9 million tons), refers to Peru's increase in fishery production from 1960 through 1964; and "Problemas y soluciones en Chile" (Problems and solutions in Chile), discusses Chile's fishing industry.

"La Evolucion Pesquero Conservera En Sud America" (The Development of Fish Canning in South America), by Mareiro, article, Industria Conservera, vol. 31, no. 316, October 1965, pp. 271-272, printed in Spanish, single copy 25 ptas. (US$0.40). Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

SPAIN:
Articles from Industria Conservera, printed in Spanish, single copy 25 ptas. (about US$0.40). Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain:

"La exportacion gallega de conservas de pescado" (Galician export of canned fish), vol. 31, no. 314, August 1965, pp. 213-217.

"Mercados--posibilidades de venta de conservas de pescado espanolas en el reino unido" (Markets--sales possibilities of Spanish canned fish in the United Kingdom), vol. 31, no. 315, Sept. 1965, pp. 255-259.

"Tecnica Conservera Anchoa" (Anchovy Canning Technique), vol. 31, no. 316, October 1965, pp. 274-281.

SUCKERS:
"Know your Maryland fishes: suckers," by Frank J. Schwartz, article, Maryland Conservationist, vol. 34, no. 5, Sept.-Oct. 1962, pp. 18-23, illus., printed, single copy 25 cents. Maryland Conservationist, State Office Bldg., Box 231, Annapolis, Md.

TUNA:
"Atunes y bonitos" (Tuna and bonito), article, Mar & Pesca, vol. 1, October 1965, pp. 27-29, illus., printed in Spanish, annual subscription $3.50. Mar & Pesca, Amargura y San Ignacio, Havana, Cuba.

"The Catch Statistic Data for the Japanese Tuna Long-Line Fishery in the Atlantic Ocean and Some Simple Considerations on It," by Toshio Shiohama, Masako Myojin, and Hisao Sakamoto, Report of Nankai Regional Fisheries Research Laboratory, No. 21, 131 pp., illus., printed in Japanese with English summary, March 1965. Nankai Regional Fisheries Laboratory, Sanbashidori, Kochi, Japan. Includes detailed data on catch records from 1956 through 1962. All charts and hook-rate tabulations are in Japanese and English.

"Changes in tuna quality, and associated biochemical changes, during handling and storage aboard fishing vessels," by I. Barrett and others, article, Food Technology, vol. 19, no. 12, December 1965, pp. 108-117, illus., printed, $14.50. Institute of Food Technologists, Suite 1350, 176 W. Adams St., Chicago, Ill. 60603.

"Le thon rouge en Mer du Nord" (Bluefin tuna of the North Sea), by Edouard Priol, article, France Pêche, no. 100, November 1965, pp. 71-73, illus., printed in French, 3.2 F. (about US$0.65). France Peche, Boite Postale 179, Lorient, France.

Reprints from Bulletin of the Japanese Society of Scientific Fisheries, printed in Japanese with English summary; Tokai Regional Fisheries Research Laboratory, Tsukisima, Chuo-ku, Tokyo, Japan:

Studies on the Retention of Meat Color of Frozen Tuna--I. Absorption Spectra of the Aqueous Extract of Frozen Tuna Meat Undergoing Discoloration, by Masamichi Bito, vol. 30, no. 10, Oct. 1964, pp. 847-854, illus. with colored plates.

,--II. Effect of Storage Temperature on Preventing Discoloration of Tuna Meat During Freezing Storage, by Masamichi Bito, no. 7, July 1965, pp. 534-539, illus.

,--III. The Discoloration of Tuna Meat During the Storage at Temperature of Freezing Point, by Masamichi Bito, vol. 31, no. 7, July 1965, pp. 540-545, illus.

UNDERWATER OBSERVATIONS:
"A towed underwater camera," by R. W. Blacker and P. M. J. Woodhead, article, Journal of the Marine Biological Association of the United Kingdom, vol. 45, no. 3, pp. 593-597, illus., printed, October 1965, $13.50. Cambridge University Press, 32 East 57th St., New York, N. Y. 10022. A description is given of an underwater camera unit mounted inside a high-speed tow-net body. The method of using this apparatus

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

for surveying the sea bed is described. The illustrations show that good quality results can be obtained when the camera is towed at speeds of around 5 knots. By keeping the camera within a fathom from the bottom, satisfactory photographs can be obtained even where turbidity prevents photography at greater ranges.

UNITED KINGDOM:

"The fecundity of long rough dabs in the Clyde Sea area," by T. B. Bagenal, article, Journal of the Marine Biological Association of the United Kingdom, vol. 45, no. 3, pp. 599-606, illus., printed, October 1965, $13.50. Cambridge University Press, 32 East 57th St., New York, N. Y. 10022.

A FISH CAN BE A LANDLUBBER

Some fish like being out of the water. The mudskipper, a small marine fish, seems right at home on land. They can stay out of water at least 90 percent of the time with only brief returns to the sea to sip some water, reports a zoologist at the Los Angeles University of California. They usually just immerse their mouths, he observed, unless they are disturbed and dive completely in the water.

Mudskippers could survive out of water for as long as a day and a half, stated the zoologist, who has been studying those fish on the island of Nosy Be, just off the coast of Madagascar. Even during the heat of the day the fish usually moistened their general body surface less than once an hour.

This ability to adapt to land gives the mudskippers more opportunities to survive, the zoologist believes. By being able to pursue insects on land, the fish are less dependent on marine organisms for food. Possibly the phenomenon of the mudskipper tells the story of how our ancestors originally emerged from the sea.

Most fish cannot survive out of water. When they do, drastic physiological changes occur, similar to those when human beings dive into water. Heart and metabolic rates slow down dramatically, and lactic acid piles up in tissues. However, none of these things happens to mudskippers when they stay on land, out of water. (Science News Letter, December 12, 1964.)

Editorial Assistants: Ruth V. Keefe and Jean Zalevsky

Compositors: Alma Greene, Mary Andrews, and Mary Donaldson

* * * * *

Photograph Credits: Page by page, the following list gives the source or photographer for each photograph in this issue. Photographs on pages not mentioned were obtained from the Service's file and the photographers are unknown.

Pp. 27 & 28--C. L. Philbrook; p. 37--T. J. Risoli; p. 41--Consulate General of Japan, N. Y.; p. 56--R. C. Naab; p. 58--W. Haskell.

TRIO OF SEAFOOD TREASURES FROM A SEA CAPTAIN'S WIFE

Shortly after sunup on a bright New England morning in early spring of 1867, a mythical ship took a mythical trip with a mythical crew aboard. On this voyage, Lucy, the Captain's wife, an avid recipe collector, wrote a series of letters to her cousin, Sarah, who remained in New Bedford. From these letters, the United States Department of the Interior's Bureau of Commercial Fisheries has captured all the romance and glamour of this century-old trip to the whaling grounds in announcing a new collection of kitchen-tested recipes for today's busy homemaker.

Are your menus winter weary? The trio of seafood treasures, fresh from the sparkling waters of the Gulf, is certain to bring the spring to your dining room.

Key West Shrimp Salad stars America's favorite seafood. The shrimp are combined with an assortment of crisp vegetables and a taste-tingling marinade, then chilled just long enough for the flavors to mingle. This imaginative salad will win showers of praise for the busy hostess.

KEY WEST SHRIMP SALAD

1 lb. cooked, peeled, cleaned shrimp, fresh or frozen
or
4 cans (4½ ozs. each) shrimp
1 can (1 lb.) cut green beans, drained
1 cup sliced raw cauliflower
1 cup sliced celery
¼ cup chopped onion
¼ cup chopped green pepper
1 tablespoon chopped pimiento

Marinade

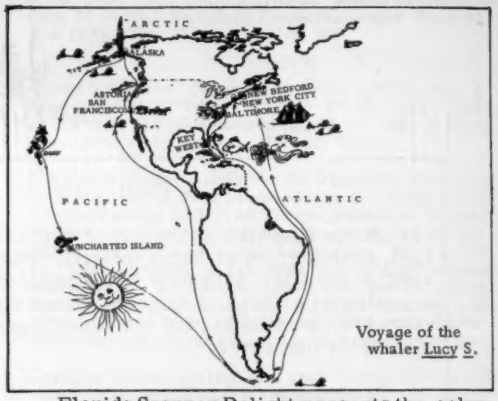
Lettuce

Thaw frozen shrimp or drain canned shrimp. Rinse canned shrimp with cold water. Cut large shrimp in half. Combine all ingredients except lettuce. Cover and let stand in refrigerator for at least 1 hour. Drain. Serve on lettuce. Serves 6.

Marinade

½ cup vinegar
1 tablespoon sugar
½ teaspoon celery seed
¼ teaspoon salt
Dash pepper
¼ cup olive or salad oil

Combine vinegar, sugar, and seasonings. Add oil gradually, blend thoroughly. Makes ½ cup marinade.



Voyage of the whaler Lucy S.

Florida Snapper Delight presents the colorful deep-water specialty of the South. The succulent snapper fillets are basted with fresh orange juice; highlighted with soy sauce; then broiled to a tender, juicy perfection.

FLORIDA SNAPPER DELIGHT

2 lbs. snapper fillets or other fish fillets, fresh or frozen
¼ cup frozen orange juice concentrate
¼ cup butter or margarine, melted
1 tablespoon soy sauce
1 teaspoon salt
Dash pepper

Thaw frozen fillets. Cut into serving-size portions. Combine remaining ingredients and mix thoroughly. Place fish, skin side up, on a well-greased broiler pan and brush with sauce. Broil about 3 inches from source of heat for 4 to 5 minutes. Turn carefully and brush with sauce. Broil 4 to 5 minutes longer, basting occasionally, until fish flakes easily when tested with a fork. Serves 6.

A new flavor note is added to the delicate goodness of crab meat in this unusual recipe, Crab Pineapple Imperial.

CRAB PINEAPPLE IMPERIAL

1 lb. king crab meat or other crab meat, fresh or frozen
or
3 cans (6½ or 7½ ozs. each) crab meat
¼ cup mayonnaise or salad dressing
1 teaspoon chopped pimiento
½ teaspoon salt
½ teaspoon Worcestershire sauce
3 drops liquid hot pepper sauce
6 large pineapple slices, drained
¾ cup fine corn flake crumbs
1 tablespoon melted fat or oil
¼ cup fine corn flake crumbs

Thaw frozen crab meat. Drain crab meat. Remove any remaining shell or cartilage from crab meat. Flake the crab meat. Combine mayonnaise, pimiento, and seasonings. Add to crab meat and mix lightly. Dip both sides of pineapple slices in crumbs. Place in a well-greased baking dish, 12 x 7½ x 2 inches. Place ⅓ cup crab mixture on top of each pineapple slice. Combine fat and crumbs; sprinkle over top of crab mixture. Bake in moderate oven, 350° F., for 20 to 25 minutes or until crumbs are lightly browned. Serves 6.

MOBILE FISH INSPECTION LABORATORY AT GLOUCESTER

The chief lot inspector at the Gloucester laboratory examines Bureau's first mobile inspection laboratory.

A specially equipped camper shuttles between the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass, and processing plants within a radius of 75 miles. The truck carries complete fishery products inspection facilities. This mobile laboratory, which made its first run in January 1966, can provide more efficient inspection services at reduced costs to the industry. It also eliminates the problems connected with transporting frozen samples.

The unit is equipped with a deep sink, hot and cold running water, air compressor, deep fat fryer, gas range, freezer, and space heater. All of the equipment, with the exception of the freezer, are operated by bottled gas. The freezer is operated through a 110-volt converter generator.